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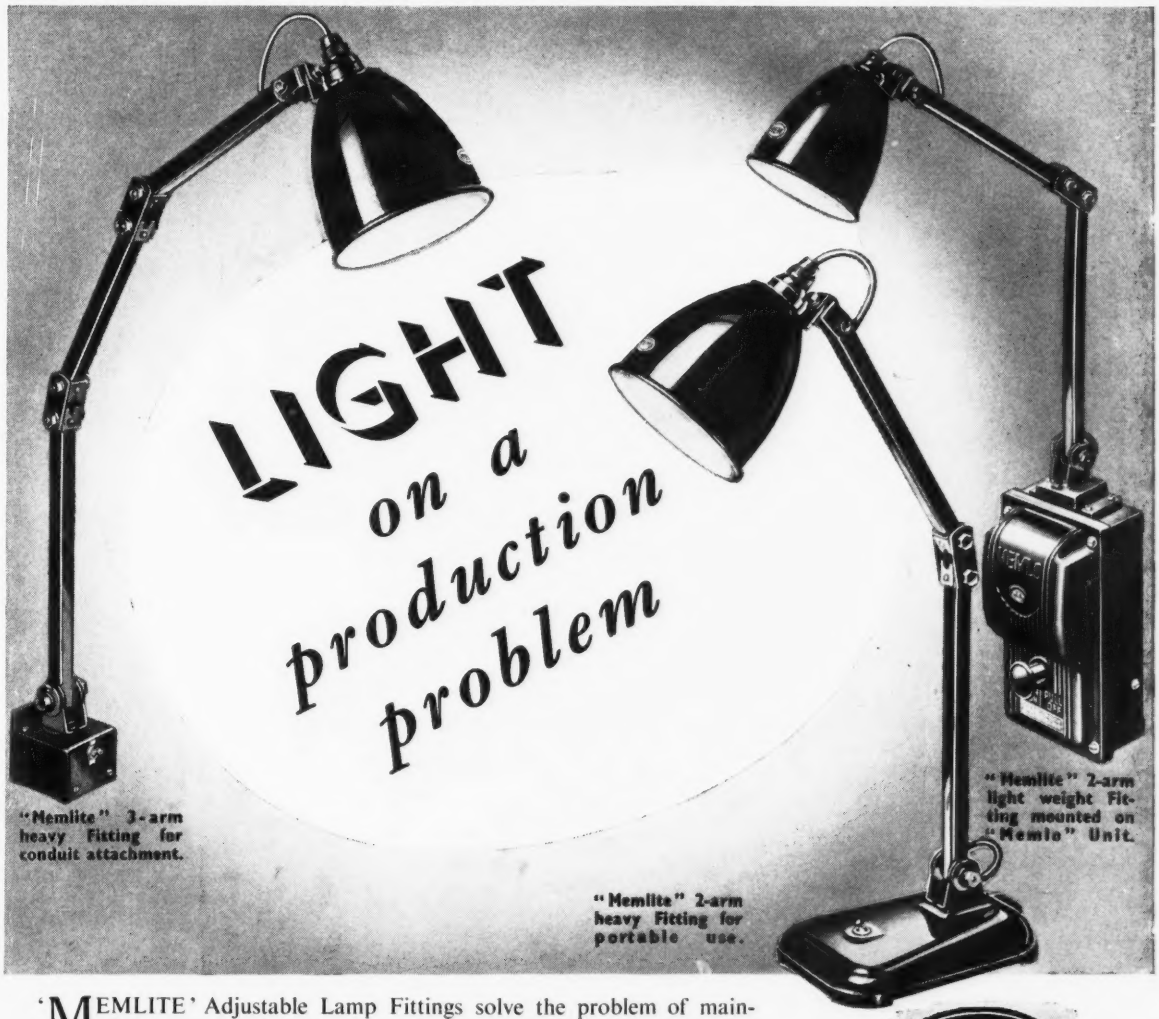
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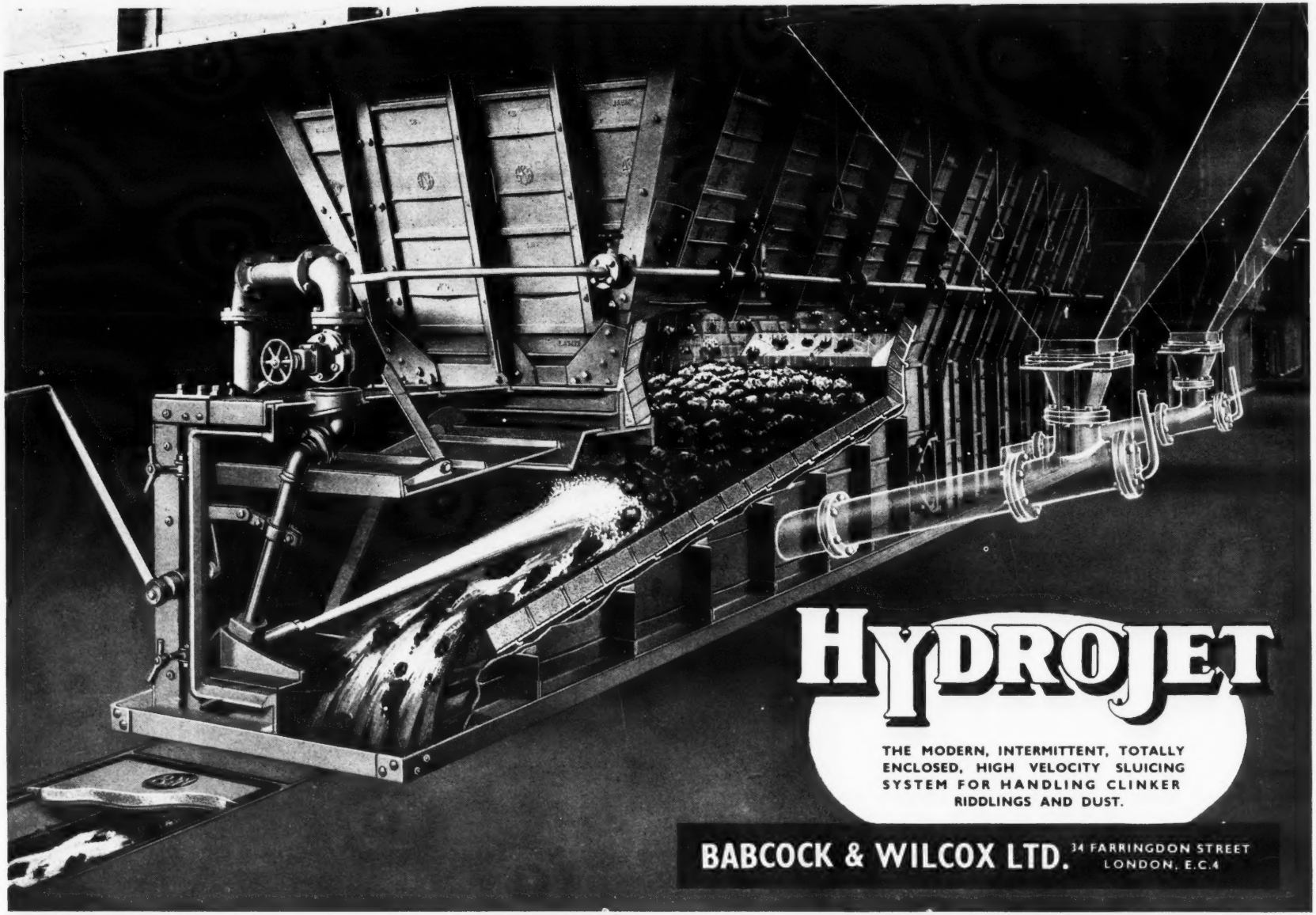
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THE ELECTRICAL REVIEW

Volume CXXVIII — No. 3305

Friday, March 28th, 1941

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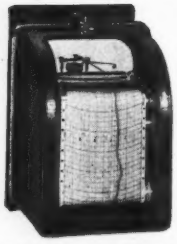

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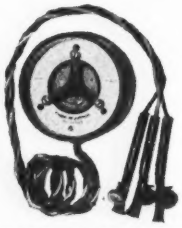

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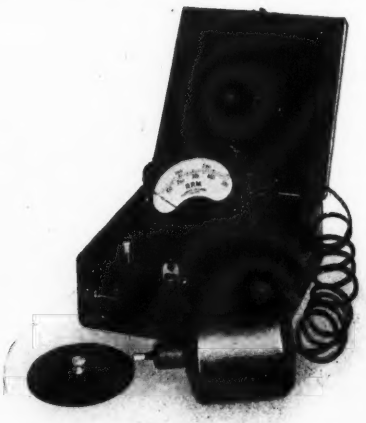


THE
ELECTRICAL REVIEW

THE OLDEST ELECTRICAL PAPER —— ESTABLISHED 1872

Vol. CXXVIII. No. 3305 MARCH 28, 1941 Price SIXPENCE

Electrical Development

Preparation for the Future

IN the course of the proceedings at the annual luncheon of the British Electrical Development Association last week, Lt.-Col. Moore-Brabazon, the Minister of Transport, said that the demand for electricity for war purposes had done artificially what the Association was formed to do.

The word to be stressed in the Minister's pronouncement is "artificially," for experience has made it plain that any development must be on a sound basis: "artificial" loads cannot be retained. While it may be expected that industry will remain electrified to a greater extent than before the war, the load created by war needs cannot be expected to continue, and unless the supply industry is to be left with a considerably greater plant capacity than is required something else must take the place of this "artificial" demand.

Maintaining Goodwill

As things are at present it is idle to think about any intensification of what may be called normal development. But that is not to say that normal development is to be entirely abandoned for the period of the war. As we have continued to point out with regard to many electrical activities, the threads must not be broken. If we cannot advance we must at least mark time and not retreat. Once connections are severed the gathering up of the loose ends will be a heavy and lengthy task.

There have been signs that the gas industry is well aware of the need for maintaining touch with the public, although at the moment there seems to have been a falling-off in the amount of "prestige" and "goodwill" publicity on behalf of gas. Circumstances have compelled the two great rivals to soft-pedal their claims to superiority in various directions and some people consider this to be such a good thing that they shudder to contemplate any resumption of active competition after the war.

Maybe a good case can be made out by the advocates of the combination, or at least the "co-ordination," of the two industries. Many view it as one phase of a comprehensive national fuel policy. It is not our purpose just now to discuss the desirability or otherwise of such a plan, for who knows what post-war conditions will be like? We shall most certainly all be poorer and for that reason alone will have to screw the last ounce out of all our resources.

Co-ordination might result in economy but this is by no means certain. What is sure is that competition between gas and electricity in the past has been good for both of them and for the public. Each of them has a monopoly in its particular districts and it is the general experience that monopolies, even when hedged about by restrictions designed to protect the public, seldom mean economy or efficiency. Competition, kept within reasonable bounds, is an incentive to improvement and progress and we maintain that the healthy rivalry between gas and electricity has kept both of them up to the mark and so far from being wasteful has, on the whole, given the public two good alternatives from which to choose instead of a "take it or leave it" service from one or the other. It has been mainly responsible for the remarkable technical progress that each has made.

Back to First Principles

It is for these reasons that we believe that the British Electrical Development Association has a great future still before it—as a *development* association—and that it must not depart too far from the principles upon which it was founded. It is now carrying out valuable work for the State which justifies its continued existence at a time when development is difficult or impossible. But it must still find time and funds for keeping open the lines of communication between the electricity supply industry and the public in a directly electrical manner.

We believe that when the war ends, although economy will be enforced upon all of us, the public will again look to electricity for many important services and the association must be ready to encourage the demand and give the guidance to both supply authorities and consumers which is the surest way of fostering sound development.

Consequently E.D.A. must conserve part of its funds to put itself in a position to meet the new conditions which will arise. It may even be possible to consider the idea of a centre worthy of the electrical industry which has been advocated for years by Lord Hirst and others. A suggestion somewhat of this nature was put forward at the annual meeting by Mr. A. J. Fippard, the new chairman of the Council.

"I Will Maintain"

WHILE recognition has been paid in various forms to the many acts of conspicuous courage on the part of employees of electricity supply undertakings during air attacks, these outstanding examples should not be allowed to obscure the fact that but for the steady and persistent devotion to duty of, literally, thousands of unnamed persons, the service could not have been maintained as it has been. Some of them have given their lives and others have suffered serious injuries, not with any thought of heroism but because it is a tradition of the service that supply must be maintained. At the E.D.A. luncheon Lord Lytton gave some instances, typical of many that have called forth from the Minister of Transport the suggestion that the old heraldic motto " I will Maintain " might well be adopted by the industry. Although there are inherent reasons why electricity supply should stand the strain better than other public services, very much is due to the training received by the men engaged in it in coping with emergencies natural to a process in which the output is produced as it is consumed. Since power stations really are a " military objective," consideration is also due to the lot of those who still await the possibility of having to face similar onslaughts. These may be relied upon to acquit themselves in an equally heroic manner.

I.E.E. Sub-Centres

IN the March *Journal* of the Institution of Electrical Engineers (Part I) are published five addresses by chairmen of local Sub-Centres. They deal mainly with subjects of which the authors have had first-hand experience and each in its own way is full of useful information. We draw especial attention to them because, in the stress of the present times, there may be a tendency to be misled by the prefix " sub " into regarding the proceedings of such bodies as of subordinate interest in comparison with those of other groups of the Institution. Classification as a Sub-Centre is merely for convenience in territorial administration and the eight Sub-Centres focus the technical activities of large numbers of electrical men in some of the most important industrial districts in the country.

The Arbitration Order

SOME doubt exists as to the extent of the scope of the Conditions of Employment and National Arbitration Order, 1940. A recent decision given by the Lord Chief Justice in the matter of an application by the Bolton Corporation indicates that the Order covers a wide ground. The Corporation sought an order of prohibition directed to the National Arbitration Tribunal to prevent it dealing with an alleged trade dispute. The matter concerned officers of the Corporation who claimed that if they were called up for the forces their Service pay should be made up to the level of their salaries, on the ground that they were still in the Corporation's employment. As the Corporation could not agree to this, the case was referred to the Minister of Labour, who decided that it was a matter for the Tribunal to adjudicate upon. The Lord Chief Justice, in refusing the application, ruled that the officers were " workmen " and the matter a " trade dispute " within the meaning of the Order; Mr. Justice Tucker concurred but Mr. Justice Atkinson disagreed with the judgment, stating that it was the intention of the Legislature to confine the operation of the Order to trade and industry. As we reported in our issue of March 14th, the Industrial Court recently decided that power station engineers were " workmen " for the purposes of the Act.

Dispersal of Static Charges

IN certain industrial processes, including the manufacture of explosives, static electricity may be generated, with consequent risk of fire unless the charge can be rapidly dissipated. Conducting rubber (which should be clearly marked as such) has proved effective for this purpose, but its resistance must not be low enough to permit the passage of power current that might leak from electrical apparatus placed on it. Otherwise it might be ignited and the cure would give the same ill results as the complaint. Fortunately, very low resistances are not required for the dispersal of charges and in most cases the specific resistance need not be less than, say, 100,000 ohms. As the heating effect with rubber at 250 V is negligible when the specific resistance is more than 65,000 ohms, there is ample margin of safety.

Mobile Substations

WHEN commenting before the war on the provision of spare substation equipment by the Central Electricity Board as part of its A.R.P. scheme, we suggested that the principle might well be extended to general emergencies in normal times. This applies also to substations of relatively small capacity, such as the 1,000-kVA unit mounted complete with switchgear on a special chassis that is being put into service in the New York area. The special feature of this substation is that it can be connected to any standard high-voltage system between 11 kV and 44 kV and transform to any standard distribution voltage from 230 to 4,600. It is proposed to use the unit to by-pass fixed substations while repairs are being carried out or to supplement existing capacity in case of sudden heavy demands. It seems to us not unlikely that the cost of mobile substations of this kind would be partly offset by a reduction in capital expenditure on those of the permanent type, since some of the safeguards required for routine maintenance of the latter might be found superfluous.

Squirrel Power

SOMEBODY in Manchester recently needed squirrel-cage motors and so he sent an advertisement to a local newspaper. A reader has sent us a cutting of the advertisement, which appeared in the section headed " Dogs, Cats, Poultry, etc." Now we are left wondering whether the person responsible for the classification visualised a squirrel-operated machine or one which, rotating at high speed, was intended to keep the little animal from the sin of idleness.

Electrical Development in 1940

Re-orientation of E.D.A.'s Activities

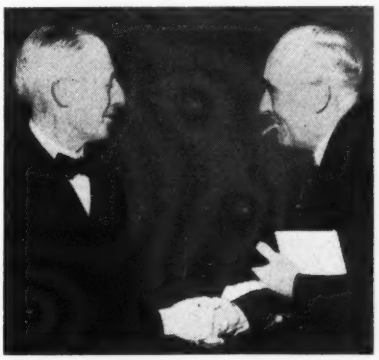
THERE was an almost pre-war attendance at the annual luncheon of the British Electrical Development Association at the Savoy Hotel, London, last Friday, the gathering comprising nearly five hundred people, including many distinguished guests. Lord Lytton, president of the Association, occupied the chair, and the guest of honour was the Rt. Hon. J. T. C. Moore-Brabazon, M.C., Minister of Transport. The Central Electricity Board and Electricity Commissioners were strongly represented, and at the top table were the presidents or chairmen of the principal electrical organisations.

Lt.-Col. Moore-Brabazon proposed the toast of the Association and recalled the proceedings which led up to the passing of the 1926 Electricity (Supply) Act, with which, as Parliamentary Secretary to the Ministry of Transport, he had a great deal to do. He referred to the many witnesses who had given evidence before the Weir Committee, upon whose report the Act was based, making particular mention of the late Sir John Snell, the late Dr. C. H. Merz, the late Samuel Insull, Mr. R. P. Sloan (upon whose system the grid was modelled and yet who was a strenuous opponent of the Bill), Mr. George Balfour, Mr. J. C. Dalton, and the late Sir John Brooke.

At the E.D.A. Luncheon

The Minister of Transport and the President, Lord Lytton

Mr. J. R. Beard (Pres. I.E.E.), Sir Cyril Hurcomb (Chairman, Electricity Commission) and Mr. F. Montague (Parliamentary Secy., Ministry of Transport)



Messrs. J. W. Beauchamp and F. J. Cursons

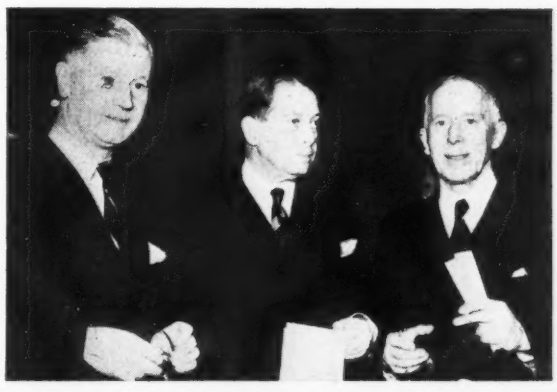
He (the speaker) had the task at that time of travelling round the country explaining to electricity supply engineers what a good thing it would be for the country for them to lose their jobs. As an example of the prejudices of those days he cited a remark made by a colleague to the effect that the current supplied by the companies was much better electricity than the local authorities' product.

The grid had not disfigured the whole country, as had been predicted. It had proved a monument of long-range planning and the war had shown its necessity. If it had not already existed it would have now been necessary to have arranged something of the kind. For one thing, asked the Minister, how else could we catch the wandering barrage balloon?

He congratulated the Central Electricity Board and the Electricity Commissioners upon their forethought in providing spares against emergencies throughout the country, and he paid a tribute to the men of the supply authorities who had carried on superbly under the stress of aerial bombardment. The supply of electricity was basic to the whole war effort, although this was not fully appreciated in all quarters. The increased demand for electricity had done artificially what the Association had been formed to do. Diversity was improving and the ordinary load was still going ahead.

Sir Archibald Page (Chairman, Central Electricity Board) and the Dowager Lady Swaythling (E.A.W.)

Everything possible must be done after the war to free ourselves from our reliance upon oil, and in this connection Col. Moore-Brabazon put in a plea for the electric vehicle. He thought, however, that there could be little real advance in its use until there was available a standard interchangeable battery.



Mr. J. C. Dalton, Mr. E. E. Hoadley (Maidstone) and Brig.-Gen. R. F. Legge

Electricity's future was a bright one and the electrical industry must be maintained in a fighting fit condition to meet post-war development and that was E.D.A.'s duty.

Lord Lytton's Reply

In the course of his response to the toast, Lord Lytton said that the pace of the war had quickened since the last luncheon but we had cause for satisfaction that in spite of widespread air attacks the supply of electricity to consumers had suffered no prolonged interruption.

The Minister had referred to the importance of electricity to our war effort and to the way in which the electrical industry had stood up to the task laid upon it. He was grateful for that tribute and he would like to say something of the way in which this had been accomplished. Every bomb that fell in a built-up area, whether it fell on a building or in the open street, was likely to cause damage to cables and interrupt the supply on which not merely our domestic comfort but our vital industries depended. Yet in spite of almost nightly raids the supply had been maintained. He doubted if the general public had any idea of what this meant; they were apt to take it for granted. The supply was only kept going by the courage, the skill and the labour of the men engaged in the industry.

Lord Barnby and Mr. Johnstone Wright (Central Board)

In the first place, the "maintained supply" was due to improvements in the distributing system carried out in the years before the war; it would not have been possible at the time of the last war. The national pool of equipment for the whole industry, the interconnection of the mains of different supply authorities, and the amalgamation of hitherto competing authorities—all these measures which had been taken during peacetime had made possible what otherwise would have been impossible.

Mr. J. M. Kennedy (Electricity Commission), right, and a fellow guest

Even so, the results achieved were due to the individual bravery of the men who operated the supply. Lord Lytton quoted a number of examples of promptitude and heroism of supply engineers in circumstances of great stress and danger, and said that it was by such acts of cool courage and efficient execution of the work in which they had been trained that the engineers and the men who worked under their direction all over the country had maintained the supply. The knowledge of what we owed to these men would, he hoped, lead to a greater appreciation of their admirable qualities.

Turning to the Association, he said that it was of value to its members even in wartime and would have a big part to play in the development—sensational development he thought it would be—which would begin as soon as the war was over. He hoped that the day was not too far distant when we could again think more in terms of "development." Despite the present alarums and excursions they had an eye—and a very constructive eye—to the future. The Association and various people in the industry had given considerable thought to the many ways in which electricity could make its contribution to the planning and building of a Britain that would at least be a more comfortable place to live in.

Engineers were essentially people of creative ability, and in their few spare moments nowadays their thoughts turned to such things as more efficient transport, factories that would provide healthier and happier working conditions for millions, and houses that were homes free from the drudgery of the old-fashioned kitchens. He felt with all his heart that in the challenge to enthusiasm and imagination which the creation of the post-war Britain would bring, the electrical industry would respond with all the best that was in it.

Annual Meeting

AT the subsequent annual meeting the accounts for 1940 (which, with the report, are dealt with below) were presented by Mr. F. W. Purse, chairman of the Council, who said that the Council had found it unnecessary to call for more than 50 per cent. of normal subscriptions from the members. He said that the Service pay of members of the staff who had joined up was being brought up to the level of their salaries by the Association. The value of furniture, etc., had been drastically written down as a safeguard against contingencies. In reply to an inquiry regarding the pensions contributions of members of the staff who were receiving more than their civil pay while in the Services, Mr. Purse said that if it was necessary the matter would be considered by the new Council.

Mr. A. E. McKenzie and Ald. A. W. Hickmott (Wimbledon)

The accounts were approved and Mr. Purse then moved the adoption of the annual report. He stated that the Council had met quarterly and the Executive Committee monthly. Electricity was apparently unknown to, or had been forgotten by, Government Departments, and E.D.A. officers had had a busy time trying to convince them of its virtues. The Association had received many letters from teachers expressing appreciation of the food charts which E.D.A. had produced.

Messrs. C. Rodgers (B.E.A.M.A.) and S. E. Britton (Chester)

In addition to the register of surplus appliances mentioned in the report, the Association was keeping a register of members of sales staffs who had become redundant, in an endeavour to place them in new positions. Referring to the "truce" between the gas and electricity supply industries, Mr. Purse said that in any event circumstances would have forced a "truce" upon them. He expressed regret that three of the large company groups still remained outside the Association.

In concluding his remarks, Mr. Purse mentioned that

upon relinquishing the chairmanship he was also leaving the Council as the Central Electricity Board had not renominated him.

Mr. A. J. Fippard, vice-chairman of the Council, moved the adoption of the report and regretted that one hundred per cent. support had not been obtained by the Association. He hoped that subscriptions would not be too much reduced. The Council should consider the advisability of expending as little as possible and building up funds with a view to housing the Association in a prominent position. He said that, thanks to Mr. Purse's influence, E.D.A. secured representation upon the Joint Gas and Electricity Committee which had given valuable service to the country.

In seconding the adoption of the report, Mr. R. Birt (Ealing) complimented the Director and his staff on their prompt service of information regarding new regulations, etc. He referred particularly to the standard specification for shelter heating.

Lord Lytton reported that his successor in the office of President was Alderman Senington, a former Lord Mayor of Bristol and chairman of the city's Electricity Committee. Alderman Senington, in taking over the chair, mentioned that he had been a member of the Bristol Electricity Committee for about thirty years. He said that Bristol had held its head up in a magnificent way during the recent grave days.

Mr. J. C. Dalton (Provincial Electric Supply Association) moved a vote of thanks to Lord Lytton and expressed the Association's great appreciation of his signal and enthusiastic service to the Association during his three years of office. Mr. A. J. Newman (Bristol) seconded the motion and Lord Lytton made a brief acknowledgment.

In proposing a vote of thanks to Mr. Purse, Mr. E. E. Hoadley (Maidstone) regretted that Mr. Purse was leaving the Council. He had done a great deal of valuable work for the Council, the Association, and for electricity supply in the wider sense. Mr. R. H. Rawll (Manchester), seconding the vote, said that Mr. Purse had had to face problems more difficult than any previous chairman had encountered.

The proceedings closed with a vote of thanks to the technical Press, the E.D.A. Committees, Circle officers, voluntary lecturers and others who had assisted the Association, proposed by Alderman W. E. Sowter and seconded by Brig.-Gen. R. F. Legge.

At a subsequent meeting of the Council, Mr. A. J. Fippard was elected chairman for the ensuing year.

Annual Report

IN its report for the year ended December 31st, 1940, the Council claims that although the character of the Association's work has been considerably altered by the war, its value to the industry has increased rather than diminished. Attention is drawn particularly to the large measure of co-operation with Government Departments and the special work carried out in connection with the electric vehicle.

Moreover, there has been an intensification and enlargement of the Association's work as a central information bureau for members. A vast amount of work has been done in keeping members supplied day by day with information, advice and official regulations in connection with war risks insurance, hire-purchase trading, the Purchase Tax, Defence Regulations, enemy aliens' accounts and other matters. Each new Order issued affecting electricity supply is closely analysed and the necessary information immediately circulated by means of special bulletins.

Other ways in which service has been rendered to members have included schemes for the protection of showroom windows, the circulation of reports on the effects of blast, the issue of electricity supply employees' identity cards, the provision of economy labels for envelopes and meter discs to warn consumers of black-out obligations.

Membership and Subscriptions

During the year six members (one controlling a group of companies) resigned and there was one new member; the net result was a reduction in membership from 419 to 389. Subscriptions were reduced to half the normal amounts and the total revenue from this source and donations fell from £119,316 to £61,983. Other items made up the total income to £64,701 (against £119,800) and the total expenditure was £63,750 (against £102,159). The surplus carried to the balance sheet was thus £950, as compared with £17,641 in 1939. Publicity work, including advertising, exhibitions, lecture service and films absorbed 58.1 per cent. of the expenditure, salaries and wages accounted for 10.5 per cent., Area Committees for 9.1 per cent., and subscriptions and donations for 8.1 per cent.

National Food Campaign

Co-operation with Government Departments, mentioned above, has taken a number of forms, one of the principal being in connection with the National Food Campaign. The Minister of Food addressed a special session of the Electricity Supply Sales Management Conference and lectures were arranged for electric cookery demonstrators. The latter were also provided with a handbook containing suggestions for demonstration talks and many recipes for home-grown foods. Before the summer, it was estimated that over half a million people had received practical guidance on wartime cookery in electricity showrooms throughout the country.

Prestige and goodwill advertisements were inserted in the

Mr. H. Hobson (Central Electricity Board), Capt. J. M. Donaldson (Northmet Co.), and Mr. Frank Hodges (Central Board)

national Press during December, 1939, and January, 1940, and later a scheme of advertising under the general heading of "Wage War on Waste" was launched. In view of difficulties created by the war situation the campaign had to be curtailed. Special advertisements were directed to various trades and professions in specialist papers and early in the year the Association collaborated with the Electric Vehicle Association in the promotion of a trade Press advertising campaign. The demand for local advertisements by members has been well maintained and forty new advertisements were prepared during the year.

Lighting Development

Although it was found necessary to suspend the domestic, shop and factory lighting campaign, it was decided to proceed with the issue of the 148-page book on "Modern Factory Lighting." At the end of the year a third edition was in the press and so far 30,000 copies have been circulated to manufacturers direct and by Government Departments.

For the information of responsible officials a booklet, "Electricity and A.R.P.," was published and another, "Notes on Electricity for Air Raid Wardens," was produced giving simple practical advice to A.R.P. staffs. Detailed investigation of the conditions in air-raid shelters was made with a view to recommending suitable methods of electric heating and ventilation. It is confidently expected that the work of the Association will lead in due course to official approval of electric heating.

At the request of the Electricity Commissioners, the Association undertook the compilation of a register of domestic appliances by means of which members needing appliances could draw upon the surpluses of other members. The practical application of electricity in communal feeding centres has been studied with a view to providing sound advice to local authorities and other bodies concerned.

In order to extend the scope of electric water heating, special attention has been given to the design of built-in heaters, using

standard components. Suitable instruction has been prepared in two forms suitable for the architect or the builder and for the hot water fitter. It is considered that the experienced gained will be of advantage in making plans for the post-war reconstruction.

The Association was of considerable assistance to the Ministry of Home Security's Joint Lighting Committee in promoting the adoption of special wartime street lighting. Although the conversion of tramways to trolley-bus operation has been retarded, the experience gained shows the value of electric transport to which it may be expected more consideration will be given after the war.

The Salesmanship Training Scheme has not been entirely suspended. During 1940 six new students were enrolled and two certificates were gained. In addition 44 Domestic Electrical Salesmanship Diplomas and four Sales Engineers' Diplomas were awarded.

Exhibition work has continued and during the year an A.R.P. Lighting and Heating Exhibition was arranged at the Building Centre. The Association also participated in the Nursing Exhibition and numerous food and cookery exhibitions organised by educational and electricity authorities.

Window Displays

Suggestions issued regularly by the Association for the arrangement of simple but effective window displays have been welcomed by members. The area " circulating library " display schemes have so far been maintained at their pre-war strength. Steps are being taken to give members facilities for window display material offered under favourable conditions by the Ministry of Food. A new series consisting of 24 complete window displays is being prepared ready for issue to the Area Committees to be used at their discretion. From July until December the Association circulated on behalf of the Ministry of Information no fewer than 3,500 complete window displays.

Every endeavour has been made to keep the Building Centre running. Unfortunately the west end of the premises suffered bomb damage in the autumn and practically the whole of the Electrical Section was destroyed. The Council decided to provide a temporary section for the benefit of exhibitors and constructional work on this was almost completed at the end of the year. It will not be possible to accommodate exhibits on the former scale but there will be ample space for photographs, diagrams, catalogues and information sheets.

Revenue from the sale of publicity matter amounted to about £6,000. Two films suitable for inclusion in the non-theatrical programmes arranged by the Ministry of Information were produced during the year. A few authorities have availed themselves of the series of one-minute films for theatrical distribution ; the service has been adversely affected by the war although engineers who have seen the films have been favourably impressed. On the other hand the lending of films to schools, camps and other institutions has increased considerably under war conditions.

Helpful support has been received from the national Press and during the year the activities of the Association formed the subject of six broadcasts.

PERSONAL and SOCIAL

News of Men and Women of the Industry

THE new president of the British Electrical Development Association, **Alderman A. A. Senington,** was born in India, and spent nearly the whole of his school days in that country and in Burma. Eventually he settled in Bristol. In 1908 he was elected a member of Bristol City Council and became an alderman in 1920. In 1923 he became the second Labour Lord Mayor of Bristol. In 1909 he was appointed a member of the Bristol Electricity Committee and has been chairman of this Committee since 1937. In the course of his service on the City Council he has been a member of many of the committees, including the Airport Committee of which he was the first chairman, a position held by him for ten years.

Ald. A. A. Senington and Mr. A. J. Fippard, President of E.D.A. and Chairman of the Council respectively

Mr. A. J. Fippard, the new chairman of the E.D.A. Council, is one of the nominees of the Central Electricity Board. He is well-known for his activities in electricity supply organisation, particularly the Provincial Electric Supply Association. Mr. Fippard was educated at Hartley College, Southampton, and the Finsbury Technical College, and received practical training at the Southampton Naval Works, and with the Bournemouth & Poole Electricity Supply Co. He served for a time as engineer-in-chief to the Hankow Waterworks & Electricity Co. and was consulting engineer to the Chinese Government. Later he became general manager of Edmundson's Electricity Corporation, Ltd., and is now chairman of the Electricity Supply Corporation, Ltd., and director of a number of associated concerns. He is a member of the I.E.E.

Mr. W. B. Hayden, whose appointment as borough electrical engineer at Epsom and Ewell, we briefly announced in our last issue, was educated at the Prebendal School, Chichester, and Chichester Technical Institute, and was an indentured pupil with the Chichester Electric Light & Power Co., Ltd. His first appointment was as shift engineer with the Leatherhead & District Electricity Co. After serving for 2½ years in the last war with the Royal Engineers he was appointed power station superintendent at Epsom and Ewell, becoming deputy borough electrical engineer in 1930. He succeeds Col. H. W. Watts, who retired on March 8th.

In our last issue we briefly reported the election of **Mr. A. P. Trotter** as an honorary member of the Illuminating Engineering Society. Born at Woodford, Essex, in 1857, Mr. Trotter was educated at Harrow and at Trinity College, Cambridge, under Clerk Maxwell, and received his practical training as a pupil with Easton & Anderson, of Erith, from 1879 to 1882. It is approximately sixty years since he commenced his pioneering work on illumination photometry and his early researches on prismatic glassware and on other kindred problems. In 1884 he entered into partnership with W. T. Goolden, at Halifax, the firm becoming Goolden & Trotter, makers of dynamos and electrical apparatus, and in 1886 he commenced to practice as consulting engineer. From 1889 to 1890 he was technical secretary of the electrical trades section of the London Chamber of Commerce, and in the latter year became editor of the *Electrician.* In 1896 Mr. Trotter went to South Africa as electrical engineer and inspector to the Government of the Cape of Good Hope, and returned to this country in 1899 to take up the appointment of electrical adviser to the Board of Trade, which position he held until 1917 when he joined the firm of consulting engineers, Handcock, Dykes & Trotter. He retired in 1920. Mr. Trotter is a member of the Institutions of Civil and Electrical Engineers, and was a member of the Institution of Mechanical Engineers from 1896 to 1916. He is also a Fellow of the Physical Society, and a past president of the Illuminating Engineering Society and of the Association of Supervising Electrical Engineers. He has many patents to his credit, the first being " apparatus for distributing and diffusing powerful lights " (1881 and 1883) afterwards developed by Holophane, Ltd. Mr. Trotter is the author of " Illumination, its Distribution and Measurement " and " The Elements of Illuminating Engineering," and has contributed various papers to scientific societies.

Mr. C. E. Fairburn, M.A. (Oxon), M.Inst. C.E., M.I.E.E., who delivered the Faraday lecture at Newcastle-on-Tyne, an abstract of which appeared in our last issue, is the deputy chief mechanical engineer and electrical engineer of the L.M.S. Educated at Bradford Grammar School and Brasenose College, Oxford, he spent a short period in a small general engineering shop before becoming a pupil (1910-1912) at the Derby works of the then Midland Railway. In 1912 he joined the Railway Department of Siemens Bros. Dynamo Works, Ltd., and from 1913 to 1916 was assistant to the resident engineer on the erection of the overhead line between Newport and Shildon on the then North Eastern Railway, the first 1,500-V DC line in England.

Mr. C. E. Fairburn

Mr. Fairburn received a commission in the R.F.C. in 1916 and later was experimental officer in the R.A.F. eventually becoming major. In 1919 he joined the English Electric Co., to organise a heavy traction department for railway electrification and he held this position until 1926 when he was appointed general manager of the Dick Kerr Works (Preston). In 1927 he was also given control of the car works of the English Electric Co. at Preston. He became general

manager of the Stafford Works of the company in 1928, retaining charge of the Preston works, and he relinquished control of the three works in 1931 to become chief engineer and manager of the Traction Department of the company. He spent much time abroad studying electric railway schemes and negotiated with the Hungarian State Railways (1926-1930) for the electrification scheme from Budapest to the Austrian frontier with Mr. Kando. In 1927 he went to Cairo to discuss the electrification of the Delta and in 1931-32 negotiated an offer for the electrical equipment for the Copenhagen Railways at 1,500 V. During 1931-33 he discussed the electrification of the Warsaw Suburban railways with the Polish State Railways. He joined the L.M.S. Railway Co. in 1934 as chief electrical engineer and in 1937 was in addition appointed deputy chief mechanical engineer.

Mr. Fairburn is chairman of the Contractors' Committee for the Electrification of the Polish State Railways, and is a member of the Institutions of Civil and Electrical Engineers, and of the Institute of Locomotive Engineers. He is a member of the London & Home Counties J.E.A. and of the North Wales & South Cheshire J.E.A., and a member of the E.R.A.

Before the war he was a member of the International Union of Railways Sub-Committee on electrical matters, and was on the International Relations Committee and the Comité Consultative International as the Railway Companies' Association representative.

Mr. D. Bellamy, general manager of the Hull Corporation electricity undertaking has been presented by members of the Transport Committee with a silver tea service as a token of appreciation of his honorary work for fifteen months as acting general manager of the transport undertaking following the death of Mr. J. Lawson, general manager, in 1939. Mr. Bellamy not only refused to draw a salary for the additional duties, but also declined to accept an honorarium. A new manager of the transport undertaking will commence his duties in a few weeks' time.

The following additional members have been appointed to the Industrial and Export Council :—Lord Portal, D.S.O., M.V.O., Parliamentary Secretary, Ministry of Supply; Mr. G. Tomlinson, M.P., Parliamentary Secretary, Ministry of Labour; Sir Nigel Campbell; Mr. C. Dukes, National Union of General and Municipal Workers; Mr. C. U. Peat, M.C., M.P., Parliamentary Private Secretary to the President of the Board of Trade; and Mr. M. Watkins, managing director, John Lewis, Ltd.

The above members have consented to serve also on the Committee of the Council which, as announced by the President of the Board of Trade, has been appointed to assist in the concentration of industries. The following members of the Council are also members of the Committee :—Mr. F. D'Arcy Cooper; Mr. S. R. Beale; Lord Forres; Mr. M. Hodgson, O.B.E., J.P.; and Sir Cecil Weir, K.B.E., M.C.

Mr. T. E. Cornford, works foreman, who has been employed at Worthing electricity works for more than thirty-eight years, has just retired. Mr. M. J. Mortimer, chief electrical engineer and manager, has presented him with war savings certificates, on behalf of the electricity undertaking.

Among awards for papers published in the 1940 proceedings of the Institution of Mechanical Engineers are the following :—Thomas Hawksley Gold Medal to Dr. F. D. Smith, and bronze replicas of the medal to his co-authors, Messrs. E. H. Lakey, H. Morgan and C. A. Luxford, for the following papers which were presented as a group :—"The Admiralty Cathode Ray Oscillograph Engine Indicator," "Basic Principles in the Design of Cathode Ray Oscillograph Engine Indicators," and "Stress Measurement by Magnetostriction"; and the T. Bernard Hall Prize to Mr. F. Dollin, B.Sc. (Eng.), for his paper on "Investigation of Steam Turbine Nozzle and Blading Efficiency."

Among the new admissions to the Fellowship of the Royal Society announced last week are **Mr. F. E. Simon,** Reader in Thermodynamics, Oxford, and **Mr. R. A. Watson Watt,** scientific adviser on telecommunications, Ministry of Aircraft Production, and formerly superintendent, radio department, National Physical Laboratory.

After occupying the Chair of Electrical Engineering at Leeds University for fifteen years, **Professor E. L. E. Wheatcroft** is resigning at the end of the present term to take up an appointment with Messrs. Merz & McLellan, consulting engineers. Professor Wheatcroft was apprenticed to the British Thomson-Houston Co., Ltd., Rugby, and was awarded a B.T.H Fellowship to the General Electric Co., Schenectady, U.S.A. He was a member of the Council of the I.E.E. from 1934 to 1936.

Prof. E. L. E. Wheatcroft

Mr. H. W. Ashby, tramway maintenance engineer at Hull, has been recommended for the appointment of transport engineer in the Bournemouth Corporation Transport Department.

Mr. T. H. Taylor, assistant electrical engineer to Richmond Corporation (Yorks) has been appointed technical engineer at Crawley to the Sussex Electricity Supply Co., Ltd.

Mr. F. James, mains foreman in the Hastings Corporation Electricity Department, has retired after forty years' service with the undertaking, and has been presented by the staff with a gold wrist watch. The presentation was made by Mr. A. J. Ryan, the borough electrical engineer.

A tribute to **Mr. T. P. Easton,** manager of the Newcastle-on-Tyne City transport and electricity undertaking, who is retiring at the end of this month, was paid at a meeting of the City Council. The Lord Mayor (Councillor A. D. Russell) said that Mr. Easton had served the department for forty-two years and had done great work in building up the city's transport services. As we have already reported, Mr. Easton's successor is **Mr. H. C. Godsmark,** of Huddersfield.

Consequent upon the retirement of **Mr. G. A. Tottman,** station superintendent, the Hammersmith Executive and Civil Defence Committee has approved the promotion of **Mr. A. C. Tedstone,** senior charge engineer, to the position. Mr. Tedstone is succeeded by Mr. G. C. Munro, charge engineer, and Mr. A. Coussins, junior charge engineer, becomes charge engineer.

Mr. H. E. Harris has joined the board of directors of J. Hibbert & Co., Ltd. This appointment is in addition to his being a director of Platt Bros. & Co., Ltd., and Asa Lees & Co., Ltd.

Mr. J. Morrison, founder and partner of the Electrical Illuminating Co., Carlisle, has taken over the management of the electrical business of Baty & Co., of Carlisle.

At the annual meeting of the Sunderland Branch of the Electrical Association for Women the Mayor (Councillor Myers Wayman) presented the Elizabeth Sloan Chesser Cup to **Miss Mary F. Kirkup,** senior demonstrator to the Sunderland Corporation Electricity Department, which is awarded annually to the demonstrator who gains the most marks in the practical test for the E.A.W. diploma in electrical housecraft.

Following a meeting of the board of directors of the Shawinigan Water & Power Co., Mr. J. Wilson, the president, announced the appointment of four assistant general managers as vice-presidents. They are Messrs. R. J. Beaumont, J.B. Challies, P. S. Gregory and J. Morse.

Obituary

Mr. Harry W. Laing, who was interred on March 12th, was transport manager to Lytham St. Annes Corporation for twenty-three years. He was originally appointed manager of Blackpool St. Annes Tramways Co., in 1906, and after the undertaking was taken over by Lytham St. Annes Corporation he continued in office until 1929.

Mr. B. P. Dinsdale.—The death has occurred, at the age of forty-eight, of Mr. Bertram Plews Dinsdale, station superintendent at Darlington Corporation electricity works, where he had been employed for about thirty years.

Mr. Edwin Robinson, whose recent death is announced at the age of seventy-three years, was well known in mining electrical engineering circles at Eckington. He was for nearly forty years associated with J. and G. Wells, Ltd., Eckington Collieries, where he was appointed chief electrical engineer in 1900, and he supervised the electrical installations in many of the company's pits.

Mr. F. A. Pine.—The death has occurred of Mr. Frank A. Pine, aged fifty-four, of Brent Lodge, Taunton Road, Bridgwater. Mr. Pine had been in business as a motor and electrical engineer for thirty years. He was a member of the Electrical Contractors' Association.

Mr. W. A. Tyson.—The death has occurred at the age of fifty-two of Mr. William Anderson Tyson, of Skelton, chief electrical engineer to the Stafford Coal & Iron Co., since 1912.

Water Power in Argentina

ANGEL Forti, professor of hydraulic construction at Padua University has drawn up for the Argentine authorities a plan to develop the hydro-electric resources of the Republic. He points out that no more than only 3 per cent. of the total electricity consumption of Argentina is met by hydraulic power. At the present time the country has developed only 57,000 HP out of a potential 27,000,000 HP.

The professor, however, does not look too far ahead; his aim is to develop the schemes already in existence, so that the total capacity may be brought up to at least 2,000,000 HP. He counters the criticism that the size of the country is too great for a safe and workable electrical network by saying that it is quite economical to carry electrical power 500 km. and mentions Boulder Dam in Los Angeles which transmits at 287,000 V over 425 km.

In his review Professor Forti divides the country into four zones, one served by the Aconcagua-Tupungato-Cerro de Plata group capable of producing 500,000 HP; the Autuel river group with a production of 240,000 HP; the Cordoba plant with 85,000 HP; and finally the Central group on the Uruguay river at Salto on the Uruguayan frontier, which could produce 1,000,000 HP.

The network envisaged by Professor Forti would serve the capital and other centres where "terminal and distributing centrals" would be built. All that would be necessary to put this plan into practice would be an agreement with the Uruguayan Government on the use of the River Uruguay on the frontier between the two countries.

War Factory Installations

Inexpensive and Flexible Methods

By S. Wood

THE lay-out arrangement illustrated and described below relates to a small factory requiring about 700 kVA which is supplied from two high-voltage sub-stations. The same scheme would be generally applicable, however, irrespective of the kVA demand.

Four-wire 400-V feeders are run from Nos. 1 and 2 substations to five switch rooms, which may be bomb- or blast-proof enclosures or merely suitable spaces or recesses. The latter are arranged in the walls at reachable height with guard rails, mounted 9 to 10 ft. from the floor level requiring a short portable ladder for operation or located high up in the roof trusses and provided with a light platform and cat ladder to provide access for the electrical maintenance and repairs staff.

Each feeder consists of four single-core tough-rubber insulated cables, which are run on cleats or bobbin insulators along walls or on poles outside buildings, or strained between roof trusses inside buildings. The switch-rooms are equipped with ironclad switch- and fuse-gear, either oil- or air-break as the capacity demands, for controlling sub-feeders to local fused distribution centres for both power and lighting. The lighting distribution fuse boards should be numerous and well dispersed in order to minimise inconvenience should any of them be damaged or destroyed.

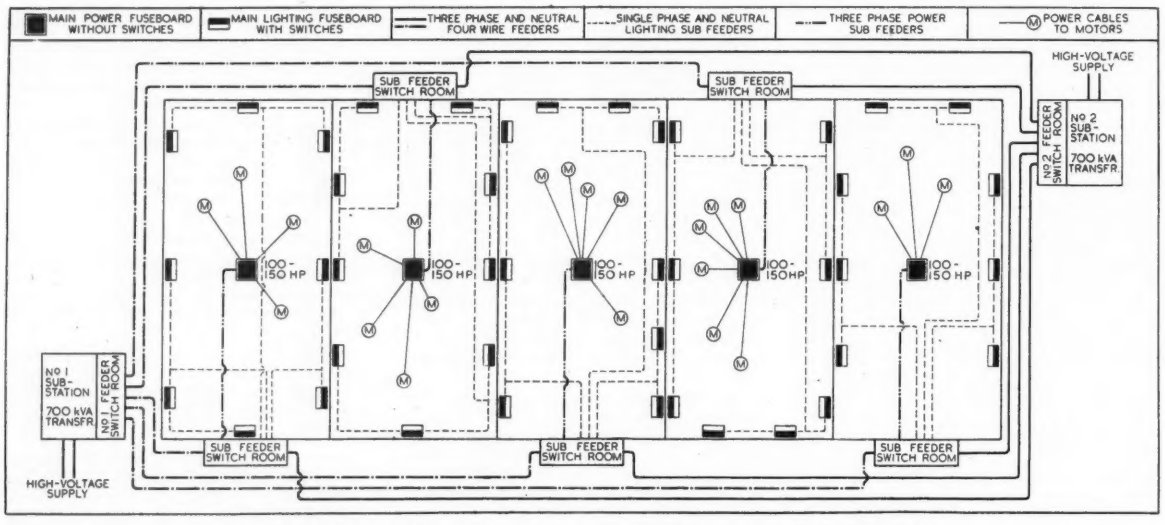
The switch rooms are provided with isolating links and quick-make terminals and jumper cables, so that changing over temporarily from one switch room to another can be carried out rapidly, or individual motors can be easily connected to another switch room in emergency.

To facilitate these operations, the wiring from the local distribution centres is by tough rubber cables or, if local conditions permit, v.i.r. cables strained on cleats or bobbins on hard wood blocks fixed to roof trusses by means of strap iron. The latter is screwed to the underside of the block and bent over and around the inverted " T " or " L " section of the steel work.

Cable drops to motors or starters are protected by conduit where necessary ; otherwise they are neatly brought down to the motor or starter terminals or isolating switch if one is used. The size and number of ways at any one distribution point are governed by the number of motors in that area. One motor per way should be arranged for and provision should be made for easily tapping cables at suitable places along their runs. With uncased wiring this should be quite a simple procedure if consideration is given to it when planning the runs, which should be spread over a wide area and not too closely bunched together.

The lighting sub-feeders should be treated in the same way. Loading should not exceed 100 A and the mains to local fuseboards should be run overhead and tapped where required up to their capacity. It is recommended that 8- or 12-way fuseboards of 15 A per way capacity be used and protected in each case by a suitable two-pole ironclad switch fixed 6 or 8 ft. above floor level, the fuseboards being mounted just above it.

Wiring for lighting points and circuits is carried out with aerial-type hard-drawn copper conductors insulated and fixed to roof trusses, etc., with cleats and three-part ceiling roses of porcelain or similar type. The switch feeds and lines where they drop down to switch points are of tough rubber or v.i.r. stranded cable protected by conduits. Clusters of switches are avoided and the lights per switch and per fuse are kept as low as possible.



Electrical distribution scheme for a small factory requiring about 700 kVA

A scheme of this kind, while of a wartime nature, could, in my opinion, be carried out on more permanent lines and would be money well invested for peacetime conditions. It offers facilities for replanning a works when required in connection with a change of policy or programme, as it allows for extensions in any direction with a minimum of expense and inconvenience and is almost immune from a local shut-down of power services.

Resistance of Concrete

HOW the electrical properties of concrete have been investigated is briefly described by Messrs. D. Maguire and M. Olen in the *Transactions* of the South African Institute of Electrical Engineers, relative to shock risk in concrete-floored rooms and the continuity of metallic earthing paths through, or embedded in, concrete. Though normal concrete when moderately dry may appear to be a fairly good low voltage insulator, its resistance can be relatively poor at high voltage. The ratio of current flow to applied voltage grows rapidly as the voltage is raised ; the resistance may be reduced to half when an applied DC is raised from 5 to 200 V. When subjected to continous electric stress there is a pronounced increase of resistance with time, which is attributed to the establishment of space charge in voids throughout the specimen, the voids being likened to condensers shunted by comparatively high resistance material. Another effect encountered, but not explained, is that removal of the applied voltage creates an EMF which is dependent upon the type of concrete, being greatest in the case of a wet specimen.

Feed Heating Plant

Effect on Station Layout and Performance

By T. H. Carr,
A.M.I.Mech.E., A.M.I.E.E.

POWER station overall thermal efficiencies in the best cases have risen from about 18 per cent. to 30 per cent. during the past twenty years or so. This increase is due to a large extent to the adoption of higher steam pressures and temperatures, low back pressures and in some cases reheating—all giving rise to an increased heat drop. Improvements have been made in boiler and turbine efficiencies, whilst regenerative feed-heating has also been developed.

The relatively small water capacity, high-rated surface and preheated-air supply of the large boiler units now in service, require high-temperature feed-water to maintain rapid evaporation and high efficiency. Back pressures have been reduced to that equivalent to a vacuum of from 28.5 to 29.5 in. Hg. and any further increase will necessitate very low-temperature circulating water and a more expensive and larger condenser and turbine.

Feed-heating has become a necessity on large sets as the gain in overall efficiency is partly offset by the reduced condensate temperature. Efficiencies of steam plants, non-feed-heating and feed-heating, cannot be compared on a basis of steam consumption alone. The only true comparison is by thermal efficiency or heat consumption. When steam is bled from a low-pressure stage of a turbine, an additional smaller quantity of steam is required at the turbine inlet and the steam consumption is therefore increased.

In this article the author, who is power station superintendent in the Derby undertaking, discusses the relationship between the heating of boiler feed water and modern steam conditions

The feed system proper commences at the discharge of the condenser and terminates at the boiler inlet or economiser outlet. In present-day stations the closed feed system is almost universally adopted. Where an open surge tank is used, means are provided for automatically controlling the supply to and from the feed system. Water which has been in contact with the atmosphere may contain from 5 to 9 c.c. of oxygen per litre, the quantity depending upon the water temperature. Condensate from a modern condenser will usually contain about 0.05 c.c. per litre.

Mr. T. H. Carr

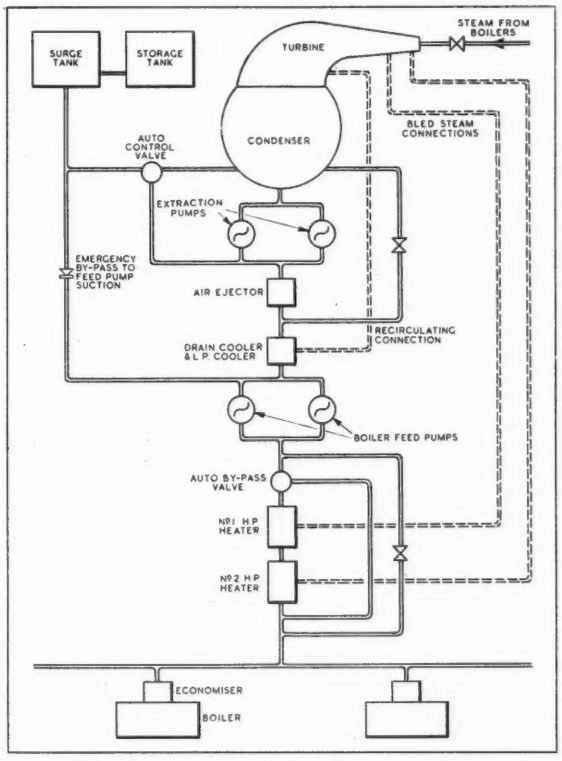
Aerated feed-water is detrimental to condenser performance, but more important is the chemical action that causes corrosion in the boiler. Corrosion troubles were experienced to a lesser extent in old plants than on present-day installations due to the formation of a protective layer of scale resulting from impure feed-water.

Make-up water has now been reduced to a maximum figure of about 5 per cent. of the steam load, and 3 per cent. is common. This make-up is supplied through an evaporator as distilled water and in this way scale-forming water is entirely excluded from the feed system, making the elimination of air of primary importance. In order to avoid corrosion troubles the oxygen content of the feed-water should not exceed 0.1 c.c. per litre and this figure is rarely exceeded in a closed system.

The aim of feed-heating in the regenerative cycle, is to endeavour to conserve the latent heat which would otherwise be given out to the circulating water. This is accomplished by bleeding a portion of the steam from the turbine and condensing this in a feed-heater, using as the cooling medium the condensate which is being returned to the boiler. The tapping point or points are chosen to suit the temperature of the condensate. The justification for installing feed-heaters can be ascertained for any particular case. The primary factors involved are: Station or turbo-alternator load factor, boiler efficiency, calorific value of coal and overall saving in heat consumption. An elaborate feed-heating system will pay for itself more quickly with a base-load turbo-alternator with a high load factor than with one which operates under low load conditions or with long shut-down periods.

Feed-heating enables a reduction to be made in the surface of the condenser since the quantity of steam entering the condenser is reduced. There is also a reduction in circulating-water pump power but an increase in boiler-feed pump power. Also with feed-heating the steam passing the low-pressure portion is reduced and, therefore, less circulating water is required for the condenser, which is a decided advantage with cooling towers.

As the output of a turbine for any given speed is limited by the area of the exhaust annulus, the output of a standard frame can be increased by bleeding steam from intermediate stages.



Arrangement of feed-heating equipment for a large turbo-alternator

Essential Components

The essential components of any feed-heating system are, speaking generally, as follows:—Condenser, extraction pumps, air ejectors, drain cooler, low-pressure heaters, boiler-feed pumps, high-pressure heaters and economisers. Other items of importance are drain pumps, evaporators and evaporator heaters, steam traps, de-aerators, surge tank and auto-control valve.

To obtain the theoretical minimum for saturated steam and operate the unit on the Carnot cycle, the feed-water would have to be heated to the initial steam temperature by means of an infinite number of stages. This is impracticable and as the number of stages increase the additional gain per stage diminishes quickly. The size of economisers and air preheaters employed also influences the final feed temperature. The number of stages to be used for any station or set depends principally on the capital outlay necessary and the efficiency required.

The overall cost of plant incorporating a feed-heating system

is greater than that of a straight-condensing set and the higher the overall efficiency the greater will be the first cost. The most efficient plant which will pay for itself in the shortest time should be chosen. Other things being equal, a reduction in cost of the coal and ash handling plants can be effected. The number of feed-heating stages to be employed also depends on the capacity of the turbine and the steam conditions.

A feed-heating system functions automatically, which is in itself a labour-saving device of no mean order. The quantity of steam diverted to each stage is controlled by the temperature and quantity of the condensate passing through the respective feed-heaters. The condensate passing through any heater will rise to a temperature within a few degrees of the saturation temperature of the bled steam fed to the heater. However much of the latter condenses it will be replaced automatically from the turbine.

Feed-water heaters are divided broadly into low-pressure and high-pressure heaters. The former are on the discharge side of the extraction pumps and the latter on the discharge side of the boiler-feed pumps. The water boxes and tube nests of the low-pressure heaters are designed to withstand the extraction pump discharge pressure, whilst the high-pressure heaters are subjected to the boiler-feed pump discharge pressure, which is considerably higher than the normal boiler steam pressure. Site conditions and space available will primarily determine whether horizontal or vertical heaters should be used.

Horizontal heaters can be placed one above the other, sometimes to a height of three or four units. In some stations the drain and other low-pressure heaters are of the horizontal type and the high-pressure heaters of the vertical type. A disadvantage of horizontal heaters is the large space for tube withdrawal required, whereas the tube nests of vertical heaters can be easily withdrawn by the station overhead crane. The arrangement of heaters should enable inspection and maintenance to be carried out on all sections of plant. The heaters are generally situated in the turbine house basement near the turbine end of the set, the majority of the control valves having extended spindles for operation from turbine-floor level.

Careful grouping of the valves permits the employment of a valve-control desk which greatly facilitates operation of the station plant.

The surge, storage and raw-water tanks may be placed in any convenient position and are often to be found on a separate floor, usually directly above the feed-pump bay. Storage and raw-water tanks are sometimes placed on the boiler house or turbine house roof.

CORRESPONDENCE

Every letter must be accompanied by the writer's name and address preferably, but not necessarily, for publication. The Editors cannot accept responsibility for correspondents' opinions.

Maintenance Men

YOUR correspondent, Mr. H. Greaves (March 7th), appears to be dissatisfied with the qualifications of his maintenance men. May I, a maintenance man of over 25 years' experience suggest that this state of affairs may possibly be his own fault, in that he has possibly acquired his maintenance men from the wrong field of labour.

I suggest that his so-called "electricians" are in fact wiremen. I am not criticising the capabilities and knowledge of wiremen, but one so often finds that where a wireman has been employed in the installation work of a factory or building he is offered the maintenance job when completed. Because of his ability to carry out a good installation it is generally assumed that he is a good electrician, but on the other hand he may have no idea of the manufacture of the plant installed or of the theory governing the machines employed. It is not necessary for him to possess this knowledge in his usual calling, therefore he cannot be expected to know the technicalities of a motor generator, or electronic tubes.

A maintenance man is usually offered less remuneration than a wireman because it is considered to be a safe job, but surely if a higher degree of skill is called for it is deserving of greater encouragement.

I thoroughly agree with the leaderette in your February 21st issue. In my opinion an electrical maintenance man should be recruited from the works of an electrical engineering company of a winding repair shop. Wiring installations are a question of common sense and skill acquired by experience. It is often easier for a man to call himself an electrician than an electrical maintenance engineer, or radio service engineer as the case may be. It most certainly would have been in my case when registering under the engineering trades last September for (just in case it might help the war effort) I stated that I could operate almost any machine tool employed in an engineers' workshop and had a most comprehensive electrical experience. This got the clerk completely guessing and I was finally registered as a handy man of some sort employed on electrical work. I was much too disgusted to argue and a friend of mine who dared to try and register as a shift maintenance engineer wasn't considered to be skilled at anything as this didn't appear in the list, so he was not registered at all. Obviously industrialists are not alone in not realising the qualifications of the maintenance man and it is high time that they were properly classified.

London, N.18, *March 13th.* GEORGE E. CHALK.

In your issue of March 7th, a works electrical engineer complains of the lack of technical knowledge of maintenance electricians, and puts this down to only unsuitable technical instruction being available, and suggests that a course of "practical theory" should be arranged at evening technical colleges.

At the majority of these colleges, electrical installation courses are held which work to the syllabus of the City and Guilds, under whose auspices the examinations are held, and although there is a small amount of mathematics incorporated in this course, it is recognised that this is absolutely necessary for the technical knowledge that an electrician should possess, and that it is useless for him to have "rule-of-thumb" instruction without understanding the principles involved, as installation electricians have to tackle many problems that do not come under that category. Such cursory knowledge might be sufficient for maintenance men who deal only with the apparatus that is contained in one factory, but it would be of no use to men employed by an electrical contractor.

He also suggests that the men displaced from the contracting industry might be turned into useful maintenance men if they were to have a course of training. This is hardly worth consideration, as in the first place there are not enough electricians available for the installation work that is being carried out and secondly, the average installation man would resent this slur on his capabilities as he is much more highly skilled practically and technically than the average maintenance man.

Electrical contractors are fully alive to the importance of seeing that technical as well as practical training is given to their apprentices who will later on become their fully trained men, and it is up to the works engineers to do the same if their work requires skilled men.

Birmingham, *March 17th.* E. A. REYNOLDS.

Your correspondent, Mr. Greaves, suggests that the present instruction available is unsuitable for maintenance electricians, and that practical classes should be instituted.

May I suggest that the present course for the Lower National Certificate, coupled with the man's employment and previous training, would offer a solution, and enable him to answer questions on phase rotation perhaps up to the "expert" mathematicians' standard.

This course is within the scope of any elementary scholar with sufficient "gumption" and energy to devote a few hours a week to study. I am afraid that Mr. Greaves is being misled by the titles of the various courses—the mechanical men may have "Utilisation of Electrical Energy," some electrical people have "Electric Traction," but no train driving is included!

London, S.W.11, *March 12th.* RONALD J. MCCOLL.

I quite concur with Mr. Greaves' comments regarding the limited knowledge of many so-called electricians. I have been connected with various technical colleges as a lecturer in the evenings on electrical engineering subjects, including advanced electrical installation work, and it is in connection with the latter subject that I have met a very considerable number of main-

tenance electricians. Most of them were engaged on maintenance work in factories using both AC and DC and it was not unusual for them to ask for assistance in solving their many troubles connected with the running and maintenance of electrical plant.

The most usual questions were :—

1. (*a*) Method of testing the phase connections of motors for star-delta starting.
   (*b*) Why it is necessary to connect the phases in star when starting up.
2. A DC shunt motor driving a lathe—speed variation required.
3. A large AC motor which has not been in use for a long time and the insulation resistance is practically zero. Require methods of drying-out windings.
4. Tests necessary before connecting three-phase transformers in parallel.
5. Purchased a secondhand transformer. The terminals of the high-voltage and medium-voltage windings are not marked. What tests are necessary to indicate which is the high or medium voltage winding ?
6. Method of improving power factor and reasons.

I may add that all the above queries are dealt with both from a technical and practical point of view in most technical colleges and my reason for mentioning these examples is to convince Mr. Greaves that instruction in " practical theory " is obtainable. I would refer him to the " Electricians' Course " which has been arranged by the City and Guilds of London Institute.

Birmingham, 20, *March 18th*. T. SIMMONS, A.M.I.E.E.

I would like to remind Mr. H. Greaves that the City and Guilds Electricians' Certificates B and C distinguish competent electricians worthy of the name from the multitude of semi-skilled men such as he describes. Most technical institutes and colleges have for many years conducted minor courses in the subjects of the examinations and these, while not calling for expert mathematicians, as do the National Certificates and C. and G. Final Certificates, do cover a wide scope of practical theory and in addition specify that practical examples of the student's work shall be available to the examiners. Before the final award of the certificate the student is required to submit proof that he is a practising electrician who has been trained or apprenticed under a competent electrical engineer.

If these facts were known more widely and employers insisted upon engaging only men with at least the C. and G. Electricians' " B " Certificate there would be fewer complaints of the nature outlined by Mr. Greaves. Perhaps you can find space to bring this before your readers as I have noticed that it is not an uncommon grouse.

HAROLD H. LAWRENCE,

Reigate Heath, *March 18th*. Grad. I.E.E.

Mysterious Fires

In your issue of March 7th, Dr. H. G. Taylor suggests bonding water mains, cable sheaths, gas pipes and the steel framework of the building together. The problem is really difficult as one cannot be sure that the continuity of even screwed steel conduits is perfect and that it will continue so. Joints in conduit are supposed to be made thoroughly, but anyone who has inspected installations knows that this is not always done with screwed tubing and that slip joints are unreliable even with continuity devices.

House water pipes are also not a good earth as they come from the water cistern which may not be bonded to the water main. Even if the water main is available the problem of making a good connection from enamelled conduits is difficult. The clips provided for the purpose are not of much use as wiremen often consider that any kind of contact is sufficient. They would be better soldered on to the tubing, but as they are not usually fixed until the cables are in position soldering is impossible, and even if it is done any dampness will cause electrolytic action with corrosion, while one cannot solder on a pipe filled with water.

Ultimately I suggest that cables will be put into houses without metallic protection, according to the suggestion which I put forward many years ago : " No conductor but *the* conductor." Where earthing is required it will be done by the laying of a separate earthing cable in the street, which will be bonded to earth plates at intervals. Disused tramlines buried in the street might also be used. Years ago I published a proposal to use copper earthing cables covered with non-corrodible lead alloy buried in the street along the cable routes and it seems likely that we shall have to come to this.

Earthing in cow byres and stables requires great care and, indeed, expert supervision is essential. Ordinary earthing clips simply disappear in these circumstances. This subject will bear research of a high order.

Tynemouth, *March 19th*. C. TURNBULL.

The First Searchlight Battery

Though I am a regular reader of the ELECTRICAL REVIEW, I missed Major Drummond's letter in your issue of March 7th. If it is not too late, the following may be of interest to him.

The Electrical Engineers R.E. (V.) was founded about 1896 or 1897. The first commanding officer was John Hopkinson, who was succeeded by Crompton. A detachment of the corps served in the South African War under Crompton's personal command, but its principal duty was the manning of coast defence searchlights at our naval ports. The Corps was recruited almost entirely from men with technical experience and its headquarters were in London. It, however, had detachments at outlying places, one of which was Chelmsford. This was largely manned by men engaged in Crompton's works.

In 1910, on the formation of the Territorial Force, the Electrical Engineers split into two, one part becoming Army Troops R.E. and eventually being converted into Signals. The other continued on coast defence work, first under the command of Crompton and later under H. M. Leaf and A. E. Le Rossignol. It was then renamed the London Electrical Engineers. As the idea of the Territorial Force was that it should be recruited locally, the Chelmsford detachment became the Essex Fortress Company, R.E., and manned the coast defence searchlights in that county.

Soon after the outbreak of war in 1914 both the London and the Essex units were considerably increased in strength, and undertook anti-aircraft work as well as coast defence. To do this satisfactorily entailed a good deal of " research " and in this connection the work of Colonel A. E. Le Rossignol, C.B., and his assistants should not be overlooked.

The early history of the Corps is given in some detail in Crompton's autobiography, and Major Drummond could check Colonel Vignoles' connection with the Chelmsford detachment by referring direct to that officer. I could supply many further details if Major Drummond would care to write to me. Like the Essex Fortress R.E. the identity of the " Londons " has been of later years almost submerged, but I think Colonel C. H. S. Evans has interested himself in its history between the two wars.

Welwyn Garden City, *March 19th*. F. H. MASTERS.

Forthcoming Meetings

THE next meeting of the Electrodepositors' Technical Society (associated with the Faraday Society) will be on March 31st at 3.30 p.m. at the Northampton Polytechnic, St. John Street, Clerkenwell, London, E.C.1. Mr. R. A. F. Hammond will deal with the " B.N.F. jet test " for determining the thickness of silver coatings, and Dr. W. Blum will present a short report on a phase of research at present being carried out at the U.S. National Bureau of Standards concerning the effects of preparation of metal upon the protective value of electro-plated coatings.

The Friday evening meetings of the Junior Institution of Engineers are to be resumed (restricted time from 6 to 8 p.m.) on April 4th and 18th at 39, Victoria Street, London, S.W.1. The annual luncheon will take place on April 26th at the Holborn Restaurant. The presidents of the leading engineering institutions having accepted invitations.

The North-Eastern Students' Section of the Institution of Electrical Engineers will hold its annual general meeting on April 18th at 6.15 p.m. at the Neville Hall, Newcastle-upon-Tyne.

The Institution of Chemical Engineers is to hold its annual meeting on April 4th at the Connaught Rooms, Great Queen Street, London, W.C.2, at 11 a.m., when Mr. F. Heron Rogers, the retiring president, will deliver an address on " Some Post-War Problems " before luncheon, at which the principal speaker will be Mr. A. V. Alexander, First Lord of the Admiralty.

At a meeting of the Institute of Fuel at the Connaught Rooms, London, W.C.2, on April 3rd (2.15 p.m.), Mr. J. G. Bennett (director, British Coal Utilisation Research Association) will present a paper entitled, " How Far is the Approximate Analysis a Reliable Guide to Coal Behaviour ?" An informal luncheon will precede the meeting at 12.45 for 1.10 p.m., price 5s. 6d. per head, exclusive of wines.

Fire Extinguishing Plant

Protection of Power Equipment

AT the direction of the Central Electricity Board in conjunction with the owners of a selected station in Lancashire, the Atlas Sprinkler Co., Ltd. (an associate company of the Crompton Parkinson group) is installing an " Oilfyre " automatic extinguishing and fire-alarm equipment for the protection of 5,000-, 10,000-, 15,000- and 20,000-kVA outdoor transformers, together with their auxiliaries, main and auxiliary reactors, indoor transformers, oil-storage tanks and the lubricating and cooling systems of four large turbo-alternators.

Atomised water is sprayed from projectors at sufficient velocity to overcome the effects of rising air currents from the fire as well as wind resistance. Water is supplied from a 6-in. connection with the town's main or, alternatively, from a 10,000-gal. cylindrical air-pressure tank, 30 ft. in diameter. These are connected separately through stop valves to a ring main from which any fractured section can be cut by means of isolating valves. As a third source of supply, two four-way breeching connections are connected to the ring main at widely separated points, thus enabling the fire brigade to utilise the plentiful supply of local water.

Each large transformer with its coolers or group of smaller transformers is covered by a separate installation of projectors, the action of which is controlled by a deluge valve actuated by a release of air pressure through the fusing (at 155 deg. F) of pilot detectors.

The air-pressure tank is protected against enemy action by being set below ground level within a concrete enclosure. It is filled half with water and half with air under pressure and is fitted with thermostatically controlled AC immersion heaters to which an alternative supply of electricity is automatically switched on should the usual supply fail. Air is supplied by a compressor in the station by a 4-HP machine in the tank house, which also supplies the air to the detector lines.

Each turbo-alternator oil system is manually controlled by a post-indicator stop valve operated from floor level. Projectors of similar type to the foregoing protect the low-pressure oil pipes, the high-pressure pipes to the governor valves and the oil purifying plant and reservoir. For each installation, a small Pelton wheel and rotating gong hammer, to which water flows through a valve port by the raising of the water clapper of the associated deluge valve, provides audible alarm. An audible and visual electrical alarm, fitted to each installation control valve, is operated by applying the pressure of part of the water flowing to the Pelton wheel to a diaphragm, causing the movement of a spindle to close electrical contacts.

Tight-Wrap Cable

American Proposals Criticised

IN a paper presented at the Philadelphia meeting of the American I.E.E. at the end of January, Mr. W. A. Del Mar described " A New Principle of Cable Design." The cable referred to has inner and outer layers of paper applied with equal tension but having different moduli of elasticity, which is said to result in stable power factor. The outer layer compresses the inner, the object being to eliminate the ionisable voids caused by loading deformation which results in instability of insulation. A paraffin-base oil with synthetic derivative of wood resin is used for impregnation.

During a discussion, reported in the *Electrical World*, at which practically all American cable makers were represented, the criticism was advanced that shrinkage tensions in drying might mask the small differences in elastic moduli. It was also suggested that prolongation of the tests would have shown that the cable behaved in the same way as the Scott (British, 1939) inverse-graded cable. In reply to a question as to whether the temperature would rise fast enough to maintain paper tightness against viscous migration of compound, it was stated that deformation was least when paper with the greatest modulus was in the outer wraps. The viscosity of the compound at 80 deg. C. was said by one contributor to be about the same as that of cable oil at 30 deg.

It was also submitted that cumulative one-way migration outward from the conductor with successive loading cycles was to be expected. Scepticism was expressed regarding the permanence of the graded elasticity objective after many load cycles. One speaker attributed the improvements claimed to reduction of stressed oil gaps near the conductor and another to the favourable shape of the conductor rather than to the graded moduli. In reply, the author said that any form of solid cable was sure to fail ultimately and that any effort to obtain a demonstrably lengthened life was justified, whether a supporting theory could be set up or not.

Flexible Mobile Substation

Facilitating Repairs and Maintenance

A THREE-PHASE 1,000-kVA transformer with primary and secondary switchgear and lightning arrestors will be used as a mobile unit by the Central New York Power Corporation. First of its type in the United States, the substation is mounted on a special lorry chassis and can be hauled at speeds up to 40 miles per hour. Compactness is obtained by the use of forced oil cooling, the overall dimensions including extensions being 11 ft. 6 in. high, 21 ft. long and 8 ft. wide. The overhead clearance can be reduced when necessary to 9 ft. 10 in. The total weight, including the chassis, is close on 10 tons. Voltage-ratio flexibility is such that connection can be made to 11-, 13-, 22-, 33-, or 44-kV lines for stepping down to 230, 460, 2,300, 4,000 or 4,600 V. For example, power can be taken from a 22-kV system and transformed to 2.3 kV or, at another point, from 13.2-kV to 4.6 kV.

For other than emergency service, such as might be required under war conditions, the unit will be used to by-pass regular

Side view of 1,000-kVA mobile substation

substations during the carrying out of repairs or maintenance or for meeting demands for new loads while the permanent substation is being extended. Engineers of the Corporation estimate that the mobile substation will be in use for various purposes for about 75 per cent. of the year.

The Corporation has located at central points in Syracuse, Utica and Watertown 2,500-kVA universal-type transformers with secondary oil circuit-breakers. These can be used separately for consumers' emergency requirements or jointly in connection with the portable substation, in which case a total load of 8,500 kVA can be carried temporarily.

Three other mobile units for undertakings are being built by the American General Electric Co. for ratings up to 3,000 kVA and to meet the appropriate road limitations.

Hydrogen-Cooling Pressure

THE American journal *Power* states that a hydrogen-cooled alternator of 25,000 kW capacity at 80 per cent. power factor has been in commission at the Ottawa St. station of the City of Lansing since the latter part of 1939 without presenting any unusual problems.

It was specified that the hydrogen pressure at full load should be 2 oz. and that overload up to 31,250 kW should be carried with an increase of pressure to 9 lb. per sq. in. Actually the windings are cooled satisfactorily at this overload if the pressure is raised to only 0.5 lb. The quantity of make-up required is about 40 cu. ft. per day.

COMMERCIAL and INDUSTRIAL NEWS

Duties of "Nucleus" Firms. New Zealand Lamp Industry.

Concentration of Industry

A MEMORANDUM has been issued by the Board of Trade (Cmd. 6258, Stationery Office, 1d.) explaining the Government's scheme for the concentration of industry in fewer factories to release labour for war work. It sets out the principles with which we have already dealt (see our issue of March 14th), stressing the fact that each industry or group of firms is being left to make the arrangements which best suit its particular circumstances.

It is stated that a firm which wishes to qualify as a "nucleus" firm must satisfy certain conditions including the following: It must provide for the complete closing down of the factory whose output is to be transferred to it and must make its own financial arrangements for the compensation of the firm taken over. The scheme must provide for the plant of the closed firm to be maintained unless the premises are requisitioned and must continue any production for export or for the Government upon which the closed firm was engaged. Also the arrangements for dealing with workers affected by the scheme must be satisfactory.

In order to comply with the last condition firms will be required to see that, so far as possible, production is concentrated where the competing demands of the munitions industries are least severe; that the labour released is adaptable and of a type likely to be readily absorbed; that labour which cannot be absorbed by war industries is taken into the factories remaining in production, as far as possible; and that the release of labour is regulated to the demand.

As we stated in our leader of March 14th, it is not considered likely that the electrical industry will be involved in this scheme to any great extent, although it is possible that one or two branches, *e.g.*, domestic appliance and lighting fittings makers not engaged in war work, may be affected.

Wages in the Cable-making Industry

The Joint Industrial Council for the Electrical Cable Making Industry announces that there will be no alteration in wages on the third pay-day in April.

Lamp Making in New Zealand

The New Zealand Electric Lamp Manufacturers, Ltd., announce in the *New Zealand Electrical Journal* that their works at Wellington are now going into production. The company will be engaged in producing the following lamps:—"Condor," "Crompton," "Ediswan," "Mazda," "Osram," "Philips" and "Siemens." The announcement states that the lamps will all comply strictly with the British Standard Specification and will carry the guarantees of life and efficiency which the imported lamps have already carried.

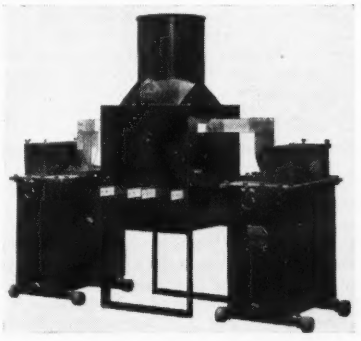
Batteries for Deaf Aids

In the House of Commons last week Mr. Ridley asked the President of the Board of Trade whether he was aware of the difficulties being experienced in securing batteries for use with electrical hearing apparatus; and whether, as this was a matter of serious concern to many deaf people, he would take early steps to have the matter remedied.

Captain Waterhouse said he was aware that there had been difficulties, which were due to increasingly heavy service demands for miniature cells. The problem of arranging for the use of other types of cell in hearing aids was being examined in consultation with the manufacturers, and meanwhile supplies of miniature cells were being released.

Rectifier for Testing Large Starter Motors

The 80-kW fan-cooled "Westalite" rectifier illustrated is used for torque testing of engine starting motors which are of very much larger size than any in normal production and would have needed a tremendous increase in the size of the battery normally used in such work. The rectifier is used for carrying out tests on the motors under extremes of temperature, *e.g.*, in the refrigerator room, and for such purposes as investigating the stall torque on the motors and for plotting torque speed curves to a base of current. The equipment consists of two 40-kW rectifiers in one cubicle, with separate transformers, and permits the normal testing of two 12-V starter motors independently, or, by connecting the two halves of the rectifier equipment in series, one 24-V machine. Another application of the "Westalite" rectifier is in test beds where engines are given their first trials, and a portable weatherproof unit has been introduced for starting aeroplane engines.



A "Westalite" rectifier equipment used for testing large starter motors

Fire Prevention Order

Following consultations between the Ministry of Home Security, representatives of the Trades Union Congress and of the employers' organisations, a memorandum, agreed by all concerned, is being issued by the Ministry of Home Security, and circulated to employers' organisations and trade unions, which explains the Fire Prevention (Business Premises) Order, and the manner in which it should be administered.

Steel Supplies Prosecution

At Willesden recently, Ascot Water Heaters, Ltd., were summoned under the Control of Iron and Steel Order (Ministry of Supply) for acquiring steel without a licence and for making a false statement in order to obtain steel.

It was stated by the prosecution that the defendants were engaged largely upon Government work and they required steel to enable them to extend their works. A licence should have been obtained but the firm did not obtain one and instead quoted the symbol or reference number of an Air Ministry contract which had nothing to do with the matter. While no doubt the steel was needed, it was not for the defendants to decide what was in the nation's interests but for the Iron and Steel Control. It was felt that the whole scheme of control would be thrown out of gear if firms acted as defendants were alleged to have done.

For the defence, it was stated that the firm had placed no direct orders for steel and that the extension was needed for storage purposes for vital work. One of the firm's engineers had given the constructional engineers the firm's authority number in good faith.

The company was found guilty and was fined £20 under each of the two summonses. A stay of execution was granted pending a possible appeal.

Australian Tariff Decisions

Included in the decisions respecting the application of the Australian Customs Tariff, issued by the Commonwealth Department of Trade and Customs are the following: Resistance studs, carbon covered, for use in the manufacture of potentiometers, variable resistance and volume controls, under security; carbon electrodes, being synthetic graphite or consisting principally of synthetic graphite, for electro-chemical purposes or for use in electric furnaces, under security; copper oxide, zinc coated, with or without connectors affixed, for use in the manufacture of electric current rectifier assemblies; and bobbins, unwound, for use in the manufacture of vibrators of the types used in wireless transmitters and wireless receiving sets, under security, all of which are free of duty under the British Preferential Tariff.

American Domestic Appliance Sales

A general advance in the sales of domestic electrical appliances in the United States during 1940 is shown by statistics appearing in *Electrical Merchandising*. Refrigerators account for the greatest value of sales, the total for the year being $395,200,000 (2,600,000 units) as compared with $321,100,000 (1,900,000 units) in 1939. Incandescent lamps were the next most important item, 1,100 million valued at $167,000,000 having been sold, against 975.5 million ($148,608,000) in the preceding year. Electric washing machines sold numbered 1,456,926 ($104,082,793) against 1,329,377 ($91,354,800). The other appliances in order of value were vacuum cleaners (floor and hand types), $79 million (against $69 million); ranges, $62.8 million ($49.2 million); irons, $18.9 million ($17.9 million); clocks, $17.6 million ($15.5 million); fans, $15.9 million ($14.9 million); toasters, $15 million ($14.9 million); and storage water heaters, $10.1 million ($9 million).

F.M.S. Import Prohibitions

Under an Importation of Goods Order, dated November 28th, 1940, the importation of certain goods into the Federated Malay States otherwise than from any country, territory or place in the British Empire, the currency of which is on a sterling basis, or Egypt, the Anglo-Egyptian Sudan or Iraq, is absolutely prohibited. The electrical items enumerated are as follows:—Electrical ware (including insulators) made of porcelain, earthenware or stoneware; uninsulated electric wire; copper wire (including uninsulated electric wire); arc lamps and searchlights; all lamp bulbs, except automobile lamp bulbs and flash and torch light bulbs; lamps; lighting accessories and

fittings; fans and regulators; wires and cables (rubber and other insulation); wires and cables, telegraph and telephone, both for submarine and other use; radio-gramophones; wireless transmitting apparatus, excluding valves; telegraph and telephone apparatus, other than wireless; other electrical machinery not elsewhere specified, such as electric capstans, electric exhaust fans, &c.

The importation of the following electrical goods, otherwise than from the places named above is prohibited except under permit:—Batteries and accumulators; batteries for hand flash lamps; instruments other than telegraphic and telephonic; goods and apparatus (except machinery) not elsewhere specified such as carbons, permanent magnets, insulating cloth, cooking and heating apparatus, cloth and tape used for electrical purposes, carbon electrodes, medical apparatus, X-ray and vacuum tubes and X-ray valves, &c., but excluding electric hand flash lamps, refrigerators and parts, wireless receiving sets, valves and other apparatus for wireless receiving sets; boiler and boiler house plant; convertors and transformers; generators; motors; ignition magnetos, ironclad switchgear, including machine control and composite switchboards; vacuum cleaners, and mining machinery.

Beehive Heating

A preliminary report has been issued by the British Electrical & Allied Industries Research Association relating to the heating of beehives (Ref. W/T5, 3s. 9d. post free). In this Mr. E. B. Wedmore describes experiments that have been undertaken to bring the subject into proper perspective, quantitatively and from the standpoint of bee-keeping, and describes the construction and preliminary testing of certain heating units. It would appear that the use of artificial heat in severe winters would avert serious loss among the bees by converting conditions to those of mild winters and would also stimulate early breeding with a view to building up a strong colony in time for the early honey harvest in April and May, instead of waiting for that harvest.

Among the diagrams included is one showing an experimental heater installed as the crown-board of a "National" hive. Two 15-W 230-V lamps, completely obscured with dull black, are wired in series to give about 9 W, allowing a temperature rise of about 10 deg. C. Tests are now being made at the Rothamsted Experimental Station under working conditions on a large scale, and the results of these should be awaited before attempting to construct heating units of the type described in this preliminary report.

Swiss Electrical Trade

According to the report for 1939 of the Federation of Trade and Industry, Zurich, exports of dynamo-electric machines, transformers and convertors declined 10 per cent. in value during that year, but home demand showed a marked increase directly war started. Exports of electrical goods as a whole fell to 53.3 million fr. in value compared with 60 millions in the previous year. On the other hand imports were higher at 26.1 million fr. against 25.3 millions, because presumably Swiss purchasing capacity, in contrast to that of many export markets, had not diminished. To the Swiss electrical manufacturer, however, export is of more importance than the home market. Some overseas markets were lost to Swiss makers of electrical control apparatus and instruments.

The home sales of telegraph and telephone apparatus and installations were satisfactory but export business was not brilliant. The war gave an impetus to home demands for radio apparatus. The same remark applies to heating appliances which were purchased readily for fear lest coal should become scarce. At the same time great difficulty was experienced in maintaining export trade. Sales of cable and insulated wire in the home market were active, particularly after the outbreak of the war, and exports rose in value to one million fr. compared with 800,000 during the previous year. The Swiss radio industry was occupied mainly on home orders but the export side was kept at its former level. Export trade in electrical equipment for motor vehicles showed a decline on 1938 by reason of the loss of several important markets. In this branch home trade plays a relatively minor role.

Electrician's Unsuccessful Action

In the King's Bench Division last week Mr. Justice Macnaghten concluded the hearing of an action brought by Mr. Donald G. Lee, electrician, against Mr. George R. Powell, electrical engineer, West Wickham. Mr. Lee claimed that upon defendant's representation that he would be taken into partnership in connection with the business of Powell & Lee, Ltd., he was induced to part with £250.

Mr. Powell denied the allegations. All that he told plaintiff was that he had plenty of work in the "offing," which was true. The money was to be put into the company in the proportion of two-thirds of the shares to the defendant and one-third to the plaintiff. They had been associated in business as master and man for some time.

His Lordship accepted the defendant's evidence and entered judgment for him with costs.

Photometric Terms

One consequence of the various Government Orders regulating either maximum or minimum values of illumination, for example those relating to factory lighting and motor car headlamps, is that persons with little previous experience of the subject are now expected to possess some knowledge of the first principles of photometry. Text books are usually much too detailed for the casual photometrist, who cares little for the underlying principles, being primarily concerned with results. Thus seekers after simple explanations of such terms as the "foot-candle" and the "lumen," or those who desire to differentiate between "brightness" and "illumination," will welcome leaflet No. 471 recently produced by Everett, Edgcumbe & Co., Ltd., Colindale Works, Hendon, London, N.W.9 (from whom copies can be obtained), which summarises the meanings of these and similar terms in such a way as to enable them to be understood by anyone wishing to interpret official lighting regulations and recommendations.

Storage Cookers in New Zealand

A writer in a recent issue of the *New Zealand Electrical Journal* says that although heat-storage cookers have been on the market only a few years, over 2,000 are now in use in New Zealand.

Raid Spotters' Pocket Book

"The Raid Spotters' Pocket Book and Log" published by Charles Lett & Co., Diary House, Borough Road, London, S.E.1, price 1s. 6d., has been produced with the object of assisting both the novice and the experienced raid spotter. All the information is given clearly and in simple language and is the result of practical experience. Among the subjects dealt with are method of identification, with thirty-two illustrations of the most common types of British, American, German and Italian aircraft; visual and sound spotting; bombing angles; cloud formations; troop-carrying gliders and parachute troops; poison gases; and fire fighting. A simple method of determining the approximate position of an object in the sky is another useful feature.

"The Spotters' Post"

British Timken, Ltd., has produced "The Spotters' Post," which contains useful hints for roof spotters and fire watchers, including identification of aircraft.

Radio for Police and Fire Brigades

Schemes for the provision of wireless transmitting and receiving apparatus for the police and/or fire brigades are proposed for Lanarkshire (£6,558), Wolverhampton (£2,459), Rotherham (£1,317), Chesterfield £1,600), Stretford and Urmston (£2,035), Carshalton (£1,232) and Harrow (£997).

Changes of Address

On and after March 31st, the Sloan Electrical Co., Ltd., will have the following new London addresses:—Head office, stores and trade counters: 41, Kingsway, W.C.2 (temporary telephone: Temple Bar 8972). East London depot: "Slonectric House," 6, Albany Road, E.10 (telephone: Leytonstone 2436). Ealing: 58, Uxbridge Road, W.5 (telephone: Ealing 4592). Watford: Sedgwicks Yard, 221, High Street (telephone: Watford 2487). Other London depots remain unchanged.

The Streamlite Electric Lamp Co., Ltd., has moved to 99, Great Eastern Street, London, E.C.2.

New Catalogues and Lists

Westinghouse Brake & Signal Co., Ltd., Pew Hill House, Chippenham.—Supplement to descriptive pamphlet No. 11 on "Westalite" rectifiers.

Simplex Electric Co., Ltd., Oldbury, Birmingham.—List P.R.9, giving the latest advances on current price lists, with notes on the application of the purchase tax to the company's products.

British Thomson-Houston Co., Ltd.—A leaflet addressed to directors and works managers explaining how B.T.H. light conditioning will increase production.

Best Products, Ltd., Felix Works, Felixstowe.—A price list (No. 5) of electric kettle elements and spare parts.

R. F. Winder, Ltd., Belgrave Electrical Works, Leeds, 2.—Priced quarterly register of surplus new and second-hand electrical machines and materials of all kinds.

George Cohen, Sons & Co., Ltd., Wood Lane, Ealing, W.12.—Stock lists of second-hand pumps, fans and blowers, and unused Hyatt type roller bearings.

Rhodes, Brydon & Youatt, Ltd., Stockport—Publication 785 relating to self-priming pumps.

INFORMATION DEPARTMENT

GENERAL inquiries from readers relating to sources of electrical goods, makers' addresses, etc., are replied to by our Information Department through the post. Inquiries should be accompanied by a stamped addressed envelope.

Our extensive records enable us to reply to most queries, but occasionally we ask for our readers' assistance in tracing names and addresses not known to us. We should be glad to have such information regarding the following:—

Electrically operated machine for making butter from cream.

IMPETUS and CORONA electric drills.

DELETO erasing machine.

ADDIATOR calculating machine.

NEW BOOKS

Railway Signals. Electrochemistry. Physics Made Simple

Railway Signalling and Communications: Installation and Maintenance. Pp. 416; figs. 339 and plates. St. Margaret's Technical Press, Ltd., 33, Tothill Street, London, S.W.1. Price 8s.

This book is based on lectures given to the staff of the Signal Department of the L.N.E.R. attending the training schools introduced in recent years on that line. The lectures are the work of several authorities and are collected and edited by A. E. Tattersall, M.I.E.E., the book being seen through the press by T. S. Lascelles.

Planned to meet a demand for a publication adapted to the needs of the linesman, installer and inspector, the book consists of nineteen chapters, the first five of which deal with the necessity for a signalling system; the construction of signal boxes, signals, point detectors; point rodding and its accessories; level crossing gates and their connections; the locking means necessitated by these; and the maintenance of mechanical signalling installations.

Then follow chapters devoted to the principles of mechanics as applied to mechanically controlled signal installations and to mechanical locking, together with a good and clearly written treatment of electricity and magnetism. The subsequent sections on telegraphs and train signalling apparatus and telephony are disappointing. Not that they are not well written and illustrated, but they omit the very many special arrangements peculiar to a railway service which would have been of considerable interest. The treatment of the direct-current track circuit is excellent for its comprehensiveness and lucidity. Typical electrical signalling circuits, AC theory, AC track circuits and the apparatus employed, and modern signalling form the subject of the final chapters.

The book is one that can be unreservedly recommended to the student of the matters with which it deals. From the positions occupied by the various contributors, the editor of the series, and the supervisor of its passage through the press, it can be relied upon as an authoritative and up-to-date treatment of railway signalling. It is well produced, both the illustrations and index are excellent and it represents truly remarkable value. It is to be hoped that when a second edition is called for the editor will see his way to extend the chapters dealing with telegraphs and telephones as applied to a trunk line railway. No doubt the question of price has had something to do with this curtailment.—H. H. H.

Industrial Chemistry. By C. L. Mantell, Ph.D. Second edition. Pp. 656; figs. 236. The McGraw-Hill Publishing Co., Aldwych House, Aldwych, London W.C.2. Price 38s.

Dr. Mantell's comprehensive volume should prove interesting to industrialists in this country because of its wide-scope revelations of electrochemical technique as developed in America. An excellent subject-index is supplemented by a name-index referring to some fifty corporations, chiefly in Canada, U.S.A. and South America. A highly detailed table of electrochemical equivalents for all the elements is included, also 236 graphs, photographs, and other diagrams. Of these, the least satisfactory are the photographs, a few of which might, perhaps, have been omitted altogether. On the other hand, the diagrams reveal a uniformly high standard of clarity and usefulness. Especially interesting and clearly laid out are the flow sheets, showing the complex interconnections between various commercial processes; only one flow sheet is slightly marred by unnecessary detail.

The chapter on electronics and photo-electric tubes is a little meagre, and would perhaps be worth while expanding in future editions. This, however, is a small flaw to find in an otherwise excellently arranged volume. The effect of the whole is to make the reader realise, if he were not already aware of the fact, how far-reaching have been the recent developments in a department formerly regarded as a minor branch of the chemical industry. Foreign technical literature, especially German, has long since appreciated the vast importance of the electrochemical industries, and the author of this book has felt the need for supplying similar organised information for the benefit of the English-speaking world.

In technical approach, Dr. Mantell starts from scratch, even defining units of current and resistance. In his survey, he includes the following sections: (1) Electrolytics, which comprises (*a*) electro-separation, represented by alkali and chlorine; (*b*) electro-winning, as in the obtaining of copper from its ores; (*c*) electro-refining, such as the production of electrolytic nickel. (2) Electrolysis of fused materials, as alumina in cryolite. (3) Electro-thermal products, such as graphite. (4) Electric furnace products: ferro-alloys, electric steel, etc. (5) Primary and secondary batteries. (6) Electrolytic reduction and oxidation of organic substances as in the conversion of nitrobenzene to aniline. (7) Electrogaseous operations, including electrostatic precipitation and nitrogen fixation.

Included also is a short but valuable chapter on polarisation rectifiers and lightning arrestors. The section on historical development includes a chart, amusing more than instructive, and a little out of place in a text-book of this type. The general format of the book upholds the high reputation of the publishers. The text is eminently readable and at the same time arranged to facilitate reference.—B. H.

Classical and Modern Physics. By Harvey E. White. Pp. 712; illustrated. Chapman & Hall, Ltd., 11, Henrietta Street, London, W.C.2. Price 21s.

At the University of California, of which he is Associate Professor of Physics, the author has for some years past been teaching an elementary course in physics, in which half the demonstration lectures are devoted to the fundamental principles of classical physics and the remainder to the development of modern physics. Encouraged by the results achieved and by the proof that even the latter branch of the subject can be taught to the beginner with no previous scientific training, he has in this book succeeded in covering in an interesting and simple style the elementary principles of the whole of the vast subject now embraced by the term "physics."

Assuming a knowledge of only the simplest principles of algebra and plane geometry, Professor White endeavours to start as nearly as possible to the beginning of each subject, illustrating the various developments wherever possible with diagrams and photographs. The general scheme is first to give a brief historical account of the discovery, with a brief biography of the person or persons responsible; secondly, an experimental demonstration of the phenomenon, followed by a discussion of the practical application; then a brief account of the accepted theory and its experimental confirmation; and finally a set of questions and problems.

After an introduction dealing with optical illusions and the units of measurement, the work is divided into ten parts covering respectively mechanics, the properties of matter, heat, sound, electricity and magnetism, light, discharges through gases, the quantum theory and atomic structure, atomic and nuclear processes, and astrophysics. That the last section should attempt and moreover succeed in imparting to a beginner even the rudiments of the theory of relativity is an indication of the author's enterprise and confidence in his methods and also of their soundness for the purpose.

The general layout of the book is excellent. The diagrams are readily comprehensible and special attention has been paid to ensuring speedy cross-reference. There can be no doubt of the author's ability to "get his subject across," and we have no hesitation in recommending the book to anyone who wishes to embark on the fascinating subject of physics or to refresh his memory of fundamentals.—W. R. C.

The J. & P. Transformer Book. By S. A. Stigant & H. M. Lacey. Pp. 916; figs. 541. Johnson & Phillips, Ltd. Price 12s. 6d. net.

It is now more than fifteen years since this standard practical technology of the power transformer was first published. From time to time, in succeeding editions, it has been considerably expanded and modified to cover advances in technique. There has been no development, however, since 1937, when the seventh edition was published, that is comparable with the issue of B.S.S. 171, so that it has been unnecessary in the present (eighth) edition to make any appreciable revision of the text, though some new illustrations representative of more recent practice have been used.

Shorter Notices

The Technology of Magnesium and Its Alloys. A translation from the German by the technical staffs of F. A. Hughes & Co., Ltd., and Magnesium Elektron, Ltd., of *Magnesium und seine Legierungen*, compiled by Dr. Ing. E.h. Adolf Beck. Pp. 512; figs. 524. F. A. Hughes & Co., Ltd., Lumn's Lane, Clifton Junction, Swinton, near Manchester. Price 30s.

Intermediate Electricity. By R. W. Hutchinson. Pp. 628; figs. 578. University Tutorial Press, Ltd., Clifton House, Euston Road, London, N.W.1. Price 12s. 6d.

Thermionic Tubes at Very High Frequencies. By A. F. Harvey. Pp. 244; figs. 99. Chapman & Hall, Ltd., 11, Henrietta Street, Covent Garden, London, W.C.2. Price 18s.

Electric Power Stations. By T. H. Carr. Vol. I. Pp. 376; figs. 165. Chapman & Hall, Ltd., 11 Henrietta Street, London, W.C.2. Price 30s.

Welding Tubular Structures

THE revision last year of B.S.S.538, which is concerned with the arc welding of mild steel for general building construction, made it clear that the requirements therein specified were not applicable to tubular structural members. The quality of steel of which the latter are made and the type of joint appropriate thereto are sufficiently diverse to justify a separare specification, which has accordingly now been issued as B.S.S.938, copies of which are obtainable from the British Standards Institution, 28, Victoria Street, London, S.W.1., price 2s. 3d., post free.

ELECTRICITY SUPPLY

Price Reduction at Leicester. Manchester 1941-2 Estimates.

Ashton-under-Lyne. — CONCESSIONS TO BOMBED PREMISES.—In the event of damage arising from enemy action causing any consumer's premises to be rendered uninhabitable for any period exceeding one week, the Electricity Committee will suspend all hire rentals for electrical apparatus which is their property, also the fixed charges under the rateable value tariff and all instalments under hire-purchase or credit sale agreements. Where, owing to the shattering of windows, it is necessary to board them up and make use of electricity for day-time lighting, the charge for electricity will be reduced (subject to the discretion of the electrical engineer in each particular case) to a flat rate of 1½d. per kWh for any consumption in excess of the corresponding quarter of the previous year.

Bedford.—TARIFF INCREASES.—The Corporation Electricity Committee recommends that tariffs now subject to a 10 per cent. increase be raised to 12½ per cent., and that various increases should be made in those tariffs which have not so far been increased.

Bradford. — SUBSTATION. — A modified scheme has been approved by the Corporation Electricity Committee for the provision of a substation at a cost of £1,527.

Bristol.—REBATE FOR BOMBED PREMISES ? —The City Electricity Committee is to reconsider its decision not to make any rebate to consumers whose premises have had to be blacked out through bomb damage.

Felling-on-Tyne.—SCHOOL SUPPLY.—Estimates are being obtained by the Education Committee for supplying electricity to Windy Nook School by means of an overhead line.

Gateshead. — SHELTER INSTALLATIONS.—The North-Eastern Electric Supply Co., Ltd., proposes to charge the Town Council 39s. for 100 W or part of 100 W per service point for the electric lighting of communal shelters.

Grampians.— INQUIRY. — The Grampian Electricity Provisional Order inquiry will open in Edinburgh on April 15th before a Commission of two Scottish M.P.'s and two Scottish peers who have not yet been chosen.

Hastings. — DEARER ELECTRICITY.—Although no increase in general lighting charges is contemplated, it is proposed to increase the charge for heating, cooking and domestic power from 0.9375d. to 1d. per kWh (from 1¼d. to 1½d. for prepayment meters). Similar increases in the multi-part tariff are also proposed, together with the introduction of meter rents ranging from 1s. 6d. to 5s. per quarter according to size.

Hove.—FURTHER INCREASE IN CHARGES.—Electricity charges are to be increased as from the beginning of the first summer quarter by the addition of a further 10 per cent. in addition to the 10 per cent. increase now in operation.

Jarrow-on-Tyne. — CABLE EXTENSION.—The Town Council is to lay a 6,000-V cable from Ellison Place to Palmer's Dry Dock.

Leeds.—LIGHTING OF SHELTERS.—Tenders are being obtained by the City Council for the installation of electric lighting in trench and surface shelters.

Leicester.—ELECTRICITY TO BE CHEAPER. —Due to the reduction of expenditure on development work it has been found possible to remove the increase of 7½ per cent. imposed on electricity accounts a year ago and return to pre-war charges. The lower charges come into force immediately.

London. — HACKNEY. — The Borough Council Electricity Committee recommends alterations in the method of control of the DC auxiliaries at the Millfields generating station. The main part of the change consists principally of cabling and the estimated cost is £1,500. It is also proposed to replace sub-distribution boards of a very old type with up-to-date iron-clad three-phase boards of standard pattern costing £1,000 so that when machines and boilers are scrapped or more auxiliaries are changed over to AC the new boards will be suitable for future service. For these alterations application is to be made for sanction to a loan of £1,000; the remaining sum of £1,500 will be taken out of revenue.

Londonderry. — DEARER ELECTRICITY. — To meet the increased price of coal, electricity charges have been advanced by 4½ per cent.

Manchester.—ELECTRICITY ESTIMATES.—The Electricity Committee estimates that sales of electrical energy will bring in a revenue of £2,289,000 in the year to March 31st, 1942, representing an increase of £291,000 on the estimate for the current year. Expenditure is budgeted thus :—Purchases from C.E.B., £1,233,000; Bloom Street station, £20,300; distribution, £327,000; rents and rates, £284,000; management and general expenses, £183,200; interest on loans, £246,000; debt redemption, £453,000. A balance of £11,275 is shown.

Estimates on capital account include :—Generating stations, land, buildings, machinery, etc., £365,600; transforming and distributing stations, etc., £60,700; and mains and services, £95,000. Increase in the revenue of the department is accounted for by the increase in aggregate sales, largely of industrial power and in a smaller degree to street traction due to the extended use of trolley buses.

Morecambe & Heysham.—SUBSTATION WORK.—Sanction is being sought by the Town Council to a loan of £9,300 for various works at substations.

Nelson.—LOANS.—The Town Council has received consent to borrow £5,400 for switch-house plant, &c., and £3,500 for consumers' electrical apparatus.

Newcastle-on-Tyne. —NEW SUBSTATION. —Subject to the consent of the Electricity Commissioners the City Council is to build another substation in order to meet requirements in the event of an emergency. The building will be equipped with electrical apparatus costing nearly £12,000, which will be met out of revenue.

RELIEF OF RATES.—Despite opposition from the Transport and Electricity Committee, the City Council has decided to take £20,000 from the funds of the transport and electricity undertaking towards the relief of rates.

Plymouth.—RELIEF SCHEME NOT PRACTICABLE.—At a recent meeting of the City Council a suggestion was put forward that, owing to the increased use of electricity for heating and cooking from ordinary lighting points, bills should be based on the normal consumption last year. In reply, Sir Clifford Tozer, said that, while the Electricity Committee had no wish to profiteer, it was not practicable to decide how much electricity had been consumed for power as compared with lighting.

Portsmouth.—INCREASED CHARGES.—As from the March meter readings the "unit" charge of the domestic floor area and maximum demand tariffs is to be increased by 0.1d. and the power tariff by 0.05d., both in the city and in the outside areas.

Romsey & Stockbridge.—SUPPLY TO LONGSTOCK.—The R.D.C. has approved a proposal of the Wessex Electricity Co. to supply electricity to Longstock.

Shropshire.—EQUIPMENT OF TECHNICAL COLLEGE.—Additional expenditure of £1,169 on the electrical equipment at the Shrewsbury Technical College has been approved by the County Council.

Spalding.—TRANSFER TO RATES.—A sum of £1,000 from the electricity undertaking has been transferred to the relief of the rates.

Thorne.—PROTEST AGAINST CHARGES.—The Parish Council is calling a conference of all the Councils dissatisfied with the terms of the Electrical Distribution of Yorkshire, Ltd., for payment for electricity not used for street lighting on account of the black-out. The company has expressed surprise that the Council should be dissatisfied with the generous concession made and states that the only alternative is to charge in strict accordance with the terms of the agreement. The clerk stated that those Councils which had paid had done so under protest.

United States.—GENERATING PLANTS.—The Federal Power Commission has issued a directory of electric generating plants in the United States which shows that there are now 1,922 plants of 1,000 kW or more of installed capacity with an aggregate capacity of 39,503,445 kW. New York State leads in total power with 5,025,892 kW, but is second to California in the number of hydro-electric plants. Of the country's total generator capacity, about 3 per cent. was installed before 1910; 18 per cent. in the next ten years; 49 per cent. in the 1920's, and the remainder since January 1st, 1930.—*Reuter's Trade Service.*

Walton and Weybridge.—NO INCREASE IN PRICES.—Despite an estimated deficit of nearly £2,000 and increases in costs, there is to be no rise in the electricity tariffs, and the Electricity Department's deficit is to be met from last year's carry-forward of £10,260. Contrary to expectations the energy sold during the past year showed an increase on that for the previous year.

West Hartlepool.—SUPPLY TO INSTITUTION.—The Town Council is to spend £540 on the relaying of underground electric cables to improve the distribution system at the Howbeck Institution.

Yorkshire.—SCHOOL SHELTER INSTALLATIONS.—The North Riding Education Committee is to have electric lighting and heating installed in school shelters at Eston, Guisborough, Loftus, Northallerton, Redcar, Richmond, Saltburn, and Skelton.

TRANSPORT

Blackpool.—RATE CONTRIBUTION.—Owing to the record revenue of the Corporation Transport Department, it has been possible to vote £18,000 out of a surplus of £69,392 to rate relief. From electricity profits, the sum of £1,000 has been voted.

Manchester.—NEW BUSES.—The Corporation Transport Committee estimates for the year make provision for the purchase of buses at a cost of £117,000 and trolley buses and equipment at £30,620.

Sunderland.—EXTENSION OF TIME.—The Ministry of Transport has sanctioned an extension by three years of the period stipulated by the Sunderland Corporation Act, 1935, for the exercise of powers for the construction of new tramways in the town.

NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specifications (1s. each) can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2.

1939

17488. "Colour television." B. T. Hewson and A. Locan. June 15th, 1939. (533993.)

18498. "Electric discharge devices." C. S. Bull and S. Hill. June 26th, 1939. (534208.)

19116. "Teleprinter exchange systems." Standard Telephones & Cables, Ltd. (L. B. Haigh, E. J. Rousseau and P. J. Clemens). June 30th, 1939. (534210.)

21057. "Electric generators." J. H. Holmes & Co., Ltd., J. W. Bayles and A. C. Fenwick. July 20th, 1939. (534016.)

21229. "Methods of making glass." British Thomson-Houston Co., Ltd. (J. Ferguson). July 21st, 1939. (533954.)

21531. "Multiplex signalling systems." Electrical Research Products, Inc. July 26th, 1938. (534213.)

21755. "Liquid compositions suitable for electrical insulation." M. H. M. Arnold and Imperial Chemical Industries, Ltd. July 26th, 1939. (534143.)

21913. "Electron-discharge devices." O. Klemperer. July 28th, 1939. (534215.)

21995. "Electrical condensers, and methods of preparing them." Standard Telephones & Cables, Ltd. August 31st, 1938. (534216.)

21996. "Condenser dielectrics." Standard Telephones & Cables, Ltd. August 31st, 1938. (534217.)

22984. "Oscillators of the type employing an electron beam." Board of Trustees of Leland Stanford Junior University. September 2nd, 1938. (534144.)

23423. "Control means for refrigerating systems." Automatic Control Corporation. September 14th, 1938. (534222.)

23656. "Alternating current signalling systems." Standard Telephones & Cables, Ltd., E. P. G. Wright and W. J. Reynolds. August 16th, 1939. (534023.)

23675. "Snap action electric switches." Plessey Co., Ltd., and C. A. Pugh. August 16th, 1939. (534024.)

23756/7. "Road traffic control syystems. Siemens & General Electric Railway Signal Co., Ltd., and F. A. Downes. August 17th, 1939. (534026/7.)

23827. "Mercury switches." Marconi's Wireless Telegraph Co., Ltd., and W. E. Pannett. August 18th, 1939. (534028.)

24074. "Electrical transformers." Jefferson Electric Co. August 22nd, 1938. (534149.)

24168. "Heat radiators for electron discharge devices." Standard Telephones & Cables, Ltd., and R. A. L. Cole. August 22nd, 1939. (533959.)

24317. "Radio direction finding systems." G. Guanella. August 23rd, 1938. (534036.)

24348. "Apparatus for washing fabrics or the like." Westinghouse Electric International Co. August 26th, 1938. (534038.)

24389. "Gas-blast electric switches." C. H. Flurscheim and Metropolitan-Vickers Electrical Co., Ltd. August 24th, 1939. (534224.)

24538. "Tuned circuit arrangements of the concentric resonant line type." Marconi's Wireless Telegraph Co., Ltd. August 25th, 1938. (534153.)

24573. "Cathodes for electron discharge devices." Marconi's Wireless Telegraph Co., Ltd. August 27th, 1938. (534154.)

24928. "Prepayment mechanisms suitable for electricity, gas, and other meters." British Insulated Cables, Ltd., and C. H. M. Thorpe. August 30th, 1939. (534233.)

25012. "Dynamo-electric machines." British Thomson-Houston Co., Ltd. September 1st, 1938. (534158.)

25071/2. "Insulated electrical conductors." British Thomson-Houston Co., Ltd. September 1st, 1938. (534159/60.)

25319. "Method of and means for obscuring and protecting glazed roofs." Edison Swan Electric Co., Ltd., and A. G. Everett. September 7th, 1939. (534238.)

25541. "Electric load control systems." P. Schiller. September 11th, 1939. (Addition to 526881.) (Cognate application, 26525/39.) (533971.)

27371. "Telecommunication exchange systems." Standard Telephones & Cables, Ltd. (L. Kozma.) October 6th, 1939. (534086.)

27862. "Alternating electric current rectifier of the selenium type." Westinghouse Brake & Signal Co., Ltd., L. E. Thompson and A. Jenkins. October 13th, 1939. (534043.)

27947. "Method of attaching electrical conductors to spark-plug insulators." AC-Sphinx Sparking Plug Co., Ltd., D. H. Corbin and R. R. Barrington. October 16th, 1939. (533974.)

28164. "Combined multi-light incandescent lamp and switch." Utility Electric Corporation. October 24th, 1938. (Cognate application, 28165/39.) (534088.)

28445. "Electric furnaces." British Thomson-Houston Co., Ltd. (J. Ferguson). October 23rd, 1939. (533977.)

29022. "Telephone systems." General Electric Co., Ltd., and E. P. Fairbairn. October 31st, 1939. (534091.)

30775. "High-frequency electric cables." Telegraph Construction and Maintenance Co., Ltd., and E. W. Smith. November 24th, 1939. (533982.)

31628. "Remote control modulated carrier signal receiver." Hazeltine Corporation. December 31st, 1938. (533989.)

32405. "Starting of gaseous electric discharge devices." British Thomson-Houston Co., Ltd. December 20th, 1938. (534004.)

32406. "Electric valve circuits." British Thomson-Houston Co., Ltd. December 21st, 1938. (534005.)

32411. "Electromagnetically operated selecting switches." B. Hinks. December 18th, 1939. (Addition to 524015.) (534103.)

32431. "Liquid cooled m.p.m.v. lamps." General Electric Co., Ltd., W. A. Bourne and H. W. B. Gardiner. December 18th, 1939. (534249.)

32442. "Ultra-high-frequency signal translating stages." Hazeltine Corporation. January 12th, 1939. (534104.)

32523. "Cyclotrons." Akt.-Ges. Brown, Boveri & Cie. December 19th, 1938. (Cognate applications, 32524/39 and 32525/39.) (534047.)

32589. "X-ray apparatus." British Thomson-Houston Co., Ltd. December 20th, 1938. (534050.)

32590. "Dynamo-electric machines." British Thomson-Houston Co., Ltd. December 22nd, 1938. (534051.)

32606. "Insulated electric conductors." Philips Lamps, Ltd. December 23rd, 1938. (534053.)

32640. "Adjustable electrical decade switch dial resistances." H. W. Sullivan, Ltd., and W. H. F. Griffiths. December 21st, 1939. (534251.)

32670. "Filter networks." Automatic Telephone & Electric Co., Ltd., and T. B. D. Terroni. December 21st, 1939. (534107.)

32699. "Magnetos." Wico Electric Co. January 26th, 1939. (534060.)

32737. "Electric ironing machines." British Thomson-Houston Co., Ltd. December 22nd, 1938. (534061.)

32738. "Protection of alternating electric current systems." British Thomson-Houston Co., Ltd. December 23rd, 1938. (534062.)

32780. "Push-pull amplifying tubes." Mullard Radio Valve Co., Ltd. December 28th, 1938. (534064.)

32811/2. "Horns for the transmission and reception of ultra-short electromagnetic waves." Standard Telephones & Cables, Ltd. January 9th, 1939. (534066/7)

23841. "Mechanical shavers and hair cutters." Wilkinson Sword Co., Ltd., H. B. Randolph and R. W. Sinclair. December 23rd, 1939. (534069.)

32928. "Lead accumulators." J. J. V. Armstrong. (R. Bosch Ges.) December 28th, 1939. (534113.)

32942. "Apparatus for the electric heat-treatment of articles." Ohio Crankshaft Co. January 27th, 1939. (534115.)

32952. "Windings for dynamo-electric machines." British Thomson-Houston Co., Ltd., and K. R. Hopkirk. December 28th, 1939. (534252.)

33031. "Illuminating system for optical projection apparatus." Technicolor Motion Picture Corporation. March 4th, 1939. (534128.)

33108. "Arc extinguishing devices for electric circuit interrupters of the air-break type." Westinghouse Electric International Co. January 4th, 1939. (534134.)

1940

130. "Combined adaptors and switches." G. Raft. January 2nd, 1940. (534165.)

449. "Magneto generators." Automatic Telephone & Electric Co., Ltd. January 11th, 1939. (534175.)

468. "Modifying networks for the transmission of high-frequency currents." Standard Telephones & Cables, Ltd. February 10th, 1939. (534176.)

515. "Battery holders for electric lamps." S. F. Pearson. January 10th, 1940. (534177.)

523. "Methods of making glass enclosures." British Thomson-Houston Co., Ltd. January 12th, 1939. (534178.)

606. "Bases for electric lamps and similar devices." British Thomson-Houston Co., Ltd. January 13th, 1939. (534181.)

928. "Electrode holders for resistance welding." Mallory Metallurgical Products, Ltd. (P. R. Mallory & Co., Inc.) January 16th, 1940. (534190.)

1009. "Elastic-fluid turbine buckets." British Thomson-Houston Co., Ltd. January 18th, 1939. (534193.)

1044. "Methods of producing sound records." Philips Lamps, Ltd. January 20th, 1939. (534199.)

1148. "Electric torches and the like." A. Kershaw. January 19th, 1940. (534202.)

1204. "Washing machines." A. R. Muir. January 19th, 1940. (534258.)

1332. "Nozzles for vacuum cleaners." Electrolux, Ltd. January 23rd, 1939. (534261.)

1337. "Fan systems for steam generating plant." H. W. K. Jennings. (B. F. Sturtevant Co.) January 22nd, 1940. (Addition to 526691.) (534263.)

1393. "On-load transformer tap changing arrangement." British Thompson-Houston Co., Ltd. (Tokyo Shibaura Denki Kabushiki Kaisha). January 23rd, 1940. (534264.)

FINANCIAL SECTION

Company News. Liquidations and Bankruptcies. Stock Exchange Activities.

Reports and Dividends

The Metropolitan Electric Supply Co., Ltd.—Presiding at the annual meeting held on March 19th, Mr. G. Balfour (chairman) said that business during the year under review had been well maintained, except in the London areas, where they in common with others, had suffered considerable diminution in consumption due to evacuation and other causes. The effect of black-out, evacuation, etc., appeared to have become more or less stationary. New business had been held in abeyance and they had confined themselves to dealing only with essential services. The progressive technical and commercial policy of the company in pre-war years had a great deal to do with the satisfactory maintenance of supply. Fortunately they started a policy of curtailing expenditure three years ago, in view of the outlook, and confined themselves largely to completing the heavy programme then in hand, and as a result, they hoped that they would be able to carry on through the war period without making a capital issue and be able to meet capital requirements by temporary borrowings in so far as not provided out of undistributed earnings.

The British Power & Light Corporation, Ltd., held its annual meeting on March 20th, when Mr. G. Wansbrough, who presided, in the course of his speech said that they had not found it necessary to make any increases in tariffs in any of their undertakings. They were restricting their development and policy so that as little as possible of the limited supplies of valuable material or of skilled labour was used for any purpose which did not contribute directly or indirectly to the war effort. Throughout their undertakings they were seeking wherever possible to employ women, in order to fit themselves to meet, with the least possible dislocation, the further calling up that was to be expected and to make the best contribution to the national effort.

The Lancashire Electric Light & Power Co., Ltd.—Presiding at the annual meeting held on March 20th, Mr. G. Balfour (chairman) said that they had every reason to be satisfied with last year's operations. Their subsidiary companies had increased their load, connected new business and had sold more kWh than in the previous year. They had not increased prices to consumers, despite heavy increases in costs, the price of coal having increased nearly 50 per cent. in the last four years. The area which they served had had its share of trouble, but they had maintained all supplies. Last year their capital expenditure was the lowest since 1918. They had been fortunate, as they had been able to go ahead rapidly, being always able to borrow and quite free to choose the time for capital issues to repay loans. If during the last few years they had been delayed in financing their programme, it would probably have meant that they would now have been caught in a period of very heavy expenditure.

The Electrical Distribution of Yorkshire, Ltd.—Presiding at the annual meeting on March 17th, Mr. R. W. Wickham (chairman) said that the setback in the early part of the war, due to the Government's rationing scheme, had worn off, improved black-out arrangements had permitted a return to more normal standards of interior lighting, and a modified form of street lighting had been approved. Economies had been made and the development of the undertaking had been curtailed by limiting extensions to those which could be regarded as essential. The increased profit for the year had been achieved without increasing the selling price of electricity. With regard to Electricity House, Ltd., the war had naturally curtailed many of its normal activities. The goodwill, however, was being maintained and the staff of workmen were fully employed on useful work of national importance.

The British Thomson-Houston Co., Ltd.—The accounts for 1940 now published confirm the figures given in the preliminary statement published in our last issue. The report states that redemption has been duly effected of the amount of 5 per cent. debenture stock required in the trust deed. Presiding at the annual meeting on March 21st Mr. W. Lusk (chairman) said that their manufacturing plants had as usual been well maintained during the year, improvements being adopted wherever efficiency and productive capacity could be advanced thereby. The capital expenditure on manufacturing equipment and buildings amounted to £251,408. As in the previous year their expenditure on A.R.P. had been heavy. They were continuing to make suitable allowances to those of their employees who had joined the forces. Under present conditions shareholders would not expect him to make any statement about the company's activities or future prospects, and he would only say that they were very busy and that their sole object at present was to make the greatest contribution in their power to winning the war.

Automatic Telephone & Electric Co., Ltd.—The stockholders have received a statement from Mr. T. A. Eades, vice-chairman and managing director, who mentions that the annual meeting is to be held in Liverpool. Sir Alexander Roger, the chairman, is still in India on a British Government mission and will be unable to attend.

The statement goes on to say that the profit for the past year was £238,052, as compared with £276,249 in 1939. Adding the balance brought forward, £405,354 is available. The allocations include £40,000 to "war contingencies and taxation reserve." A final dividend of 7 per cent. is paid on the ordinary stock, making 10 per cent. for the year, plus 2½ per cent. bonus. The deferred stock receives 10 per cent. and a bonus of 2½ per cent. for the year. The hope is expressed that the Chancellor of the Exchequer will be able to introduce amendments to the Excess Profits Tax. The company is stated to be fully occupied, the personnel being the largest on record.

Brown Bros., Ltd., report net profits, after tax of £112,360, as compared with £84,754 for the previous year. The dividend for the year is maintained at 12½ per cent. by a final payment of 10 per cent. General reserve receives £25,000, war contingencies reserve £25,000, and employees' funds £5,000. The balance carried forward is £92,748 (against £84,249 brought in).

Ericsson Telephones, Ltd., in their report for 1940 state that after charging £124,532 for taxation, the net profit was £129,788, as compared with £140,171 for 1939. As already announced, it is proposed to pay a final dividend of 12 per cent., and a bonus of 5 per cent. on the ordinary stock, making a total distribution of 22 per cent., tax free, for the year (against 25 per cent.), to place £20,000 to general reserve, £10,000 to dividend equalisation reserve, £10,000 to post-war contingency reserve, and to carry forward £36,417 (against £43,135 brought in). The report states that the output for the year established a fresh record.

The Telephone & General Trust, Ltd., reports net profits for 1940 of £114,287, as compared with £112,529 for 1939. The final dividend on the ordinary stock is 5 per cent., making 8 per cent. for the year (unchanged), and the balance carried forward is increased from £62,569 to £68,196.

Venner Time Switches, Ltd., announces that no dividend is to be paid at the present time on the 8 per cent. cumulative preference shares for the past half year.

The Dublin United Tramways Co., Ltd., reports a net revenue from omnibuses for 1940 of £172, 040, as compared with £128,305 for the previous year, and a net loss on the trams of £670 (against a credit balance of £35,562). After deducting interest and other charges and adding £16,670 brought in, the balance available is £118,961 (£114,069). The final ordinary dividend is 3 per cent., maintaining the dividend for the year at 4 per cent., and £21,561 is carried forward.

The British Aluminium Co., Ltd., reports a profit for 1940 of £912,211, as compared with £1,075,796 for 1939. After deducting directors' fees (£29,055), income tax (£150,000), debenture service (£175,000), depreciation (£50,000) and placing £100,000 reserve, it is proposed to pay a final ordinary dividend of 7 per cent., making 10 per cent. for the year (against 12½ per cent.), and to carry forward £194,796 (against £176,640 brought in). A sum of £500,000 of the total reserve has been allocated to cover fully, as valued in the books of the company, the assets in the enemy-occupied territory of Norway and France.

The Folkestone Electricity Supply Co., Ltd., has postponed the half-yearly dividend on the 5 per cent. cumulative preference, due on April 1st.

The National Gas & Oil Engine Co., Ltd., reports that the net profit for 1940 was £64,548, as compared with £32,786 for the previous year, and after providing for taxes, and writing off part of the A.R.P. expenditure, and adding £20,903 brought in, there is a balance of £69,951. The ordinary dividend for the year is raised from 2½ to 5 per cent. and £27,951 is carried forward.

Waste Heat & Gas Electrical Generating Stations, Ltd., reports a net revenue for the year to January 31st, of £11,355, as compared with £12,547 in the preceding year. The dividend on the ordinary stock for the year is maintained at 8 per cent., by a final payment of 5½ per cent., £2,000 is placed to reserve, and £18,953 is carried forward (against £18,798 brought in).

The Shanghai Electric Construction Co., Ltd., is paying a dividend of 2 per cent. for 1940 (against 5 per cent.).

Enfield Rolling Mills, Ltd., are paying a dividend for the year of 2½ per cent. (against 3½ per cent. for fifteen months).

Worthington-Simpson, Ltd., have declared a final dividend of 3½ per cent., making 7 per cent. for the past year, against 10 per cent. for 1939.

New Companies Registered

Page & Miles, Ltd.—Private company. Registered March 13th. Capital £1,500. Objects: To acquire the business of electrical engineers carried on by Page & Miles, Ltd. (in voluntary liquidation) at 60, Western

Road, Brighton, and to carry on the business of manufacturers of, and dealers in, dynamos, motors, armatures, batteries, wireless and television apparatus and accessories, etc. Directors: H. W. S. B. Bjerkegren, "Claremont," Dyke Road, Hove, S. R. Burbidge, 80, Dudley Road, Brighton and K. I. Julian, 6, Barrowfield Lodge, Hove. Solicitors: Nye and Downe, Brighton.

Godsons (Romiley) Ltd.—Private company. Registered March 8th. Capital £500. Objects: To acquire the business of a radio engineer and dealer in electrical goods carried on by Wm. Godson, at Romiley, Cheshire. Directors: Wm. Godson, 14, Compstall Road, Romiley, and S. S. Dawdney, "Effra," Central Drive, Romiley. Secretary: A. S. S. Dewsbury. Registered office: 22, Compstall Road, Romiley.

Ward & Reeves, Ltd.—Private company. Registered March 1st. Capital, £250. Objects: To carry on the business of manufacturers and repairers of, and dealers in, armatures, magnetos, batteries, conductors, insulators, transformers, stoves, cookers, glass, pottery, rubber, insulating materials, electrical supplies, etc. Directors: J. H. Runbaken, "Maryvale," Hill Top, Wilmslow, Ches., and A. H. Ward, 122, Lower Bents Lane, Bredbury, Ches. Secretary: T. Walstow. Registered office: 71/73A, Oxford Road, Manchester, 1.

Lonsdale & Co. (Electric) Ltd.—Private company. Registered March 13th. Capital £100. Objects: To carry on the business of electricians, electrical, radio and television, and mechanical engineers, etc. Subscribers: F. Smithies and Mrs. E. F. Smithies, both of Clairwood, Sandown Drive, Sale, Cheshire. Registered office: 2, Barlow Road, Levenshulme, Manchester.

Companies' Returns

Statements of Capital

Killarmarsh & District Electric Supply Co., Ltd.—Capital £8,000 in £1 shares. Return dated November 2nd, 1940. 4,725 shares taken up, £4,725 paid. Mortgages and charges: Nil.

W. R. Sykes Interlocking Signal Co., Ltd.—Capital £37,550 19s. in 46,173 "A" shares of 10s. each and 41,327 "A" shares of 7s. each. 41,327 "A" 7s. shares taken up. £7,232 4s. 6d. paid (3s. 6d. per share). £424 7s. 6d. received on 970 "A" 10s. shares forfeited. £7,232 4s. 6d. considered as paid. Mortgages and charges: Nil.

Ellis & Ward, Ltd.—Capital £10,000 in 2,000 preference and 8,000 ordinary shares of £1 each. Return dated January 7th, 1941 (filed March 6th, 1941). 1,000 preference and 6,003 ordinary shares taken up. £1,003 paid on three ordinary and 1,000 preference. £6,000 considered as paid on 6,000 ordinary shares. Mortgages and charges: Nil.

Sterling Electric Holdings, Ltd. (formerly John Ismay & Sons, Ltd.). — Capital £300,000 in 200,000 6½ per cent. cumulative preference of £1 and 2,000,000 ordinary shares of 1s. each. Return dated February 14th, 1941. 200,000 preference and 1,200,000 ordinary shares taken up. £254,000 paid, including £30,250 premiums. £36,250 considered as paid on 725,000 ordinary shares. Mortgages and charges: Nil.

Ferranti, Ltd.—Capital £900,000 in £400,000 ordinary stock and shares of 10s. each and £500,000 7 per cent. cumulative preference stock. Return dated November 8th, 1940. £300,000 ordinary stock and £500,000 preference stock taken up. £353,834 paid. £446,166 considered as paid. Mortgages and charges: Nil.

Metallic Seamless Tube Co., Ltd.—Capital £65,333 6s. 8d. in 20,000 preference shares of 13s. 4d. and 260,000 ordinary shares of 4s. Return dated November 7th, 1940. 15,245 preference and 260,000 ordinary shares taken up. £36,163 6s. 8d. paid on 15,245 preference and 130,000 ordinary shares. £26,000 considered as paid on 130,000 ordinary shares. Mortgages and charges: Nil.

Electro-Alloys, Ltd.—Capital £10,000 in 10,000 shares of £1 each. Return dated November 2nd, 1940. 5,000 shares taken up. £2,000 paid. £3,000 considered as paid. Mortgages and charges: Nil.

Mortgages and Charges

Johnson, Pearce & Co., Ltd.—Debenture charged on the company's undertaking and property, present and future, including uncalled capital, dated February 26th, 1941, to secure all moneys due or to become due from the company to Barclays Bank Ltd.

S. Lightfoot, Ltd.—Mortgage of contract moneys dated February 15th, 1941, to secure all moneys due or to become due from the company to Barclays Bank, Ltd.

Truvox Engineering Co., Ltd.—Charge on moneys due under contracts dated March 6th, 1941, to secure all moneys due or to become due from the company to Westminster Bank, Ltd.

Receiver Released

Cyril F. Taylor, Ltd.—G. H. W. Ferrett, of 76, Leadenhall Street, E.C., ceased to act as receiver on January 4th, 1941.

Bankruptcies

Improved Radio & Electrical Co. (a firm), Oxford House, Falcon Square, E.C.—At a sitting of the London Bankruptcy Court held recently before Mr. Registrar Kean, Maurice Hyman, who carried on the above business, attended for public examination upon accounts showing liabilities of £2,943 and assets £49. Replying to Mr. H. H. Gaine, the Official Receiver, the debtor admitted two prior bankruptcies, from both of which he had been discharged. He attributed his insolvency to the margin of profits not being sufficient to meet overheads and living expenses and to lack of trade owing to the international unrest. The examination was concluded.

H. Stansfield, late electrician, now journeyman electrician, 25, Sunnydale Park, Ossett, Yorkshire, lately carrying on business at 7, Station Road, Ossett, Yorkshire.—The public examination was held recently at the County Court, Eightlands, Dewsbury. The debtor ascribed his failure to liabilities taken over on the dissolution of a partnership and insufficient turnover and profit.—The examination was concluded, it being stated that the debtor had agreed to pay 30s. a month off his liabilities.

H. White, radio and electrical engineer, Ridgeway Lane, near Ambergate, and lately trading at 38, Nottingham Road, Ripley.—Trustee, Mr. A. J. Rogers, 22, Regent Street, Park Row, Nottingham, Official Receiver, released March 12th.

E. M. Jones, electrical engineer, 26, Eastgate, Aberystwyth.—Trustee, Mr. H. W. Thomas, 4, Queen Street, Carmarthen, Official Receiver, released March 14th.

H. J. Brownhill, electrical engineer, carrying on business at the back of 48, Whitehouse Street, Walsall.—First and final dividend of 20s. in the £, together with 4 per cent. statutory interest, payable April 17th, at 37, Temple Street, Birmingham.

Electrical Imports of Argentina

Decline during the First Half of 1940

IN view of the decline in Argentine exports, due to loss of European markets, and the consequent check to local purchasing power, it is hardly surprising to find a diminution in the country's electrical imports. Those of electrical apparatus during the first half of 1940 were over a million pesos less in value than in the first half of 1939.

The accompanying statement has been extracted from the official foreign trade returns recently published in Buenos Aires, and shows the principal electrical imports into the Republic during the first six months of 1940, with notes of increases, or decreases compared with the corresponding period of the preceding year.

Among the few sections of the trade to escape the decline are materials for house lighting, small motors, and parts for accumulators, batteries and radio apparatus. The increased imports of parts indicates an extension of local assembly or manufacture. The values stated below are those adopted by the Argentine Customs (about 17 paper pesos to the £).

	Jan.-June 1940 Thous. Pesos	Inc. or dec. as compared with Jan.-June 1939 Thous. Pesos
Dynamos over ¼ HP	1099	— 161
Electric motors up to ¼ HP	160	+ 40
Fan motors	70	— 33
Cable and wire, up to 5 mm., covered with cotton, rubber, etc.	550	— 320
Cable and wire, over 5 mm., covered with cotton, rubber, etc.	113	— 140
Cable and wire, up to 5 mm., lead-covered	116	— 101
Cable and wire, over 5 mm., lead-covered	1130	— 703
Cable and wire, silk-covered	6	— 5
Cable and wire, enamelled	177	— 11
Flex, covered with cotton, wool, etc.	171	— 126
Flex, covered with silk	21	+ 1
Telephone cables, underground, lead-covered and steel or iron armoured	1749	— 2752
Telephone cables, iron or steel, covered with cotton, guttapercha, etc.	161	— 83
Accessories for underground cables	26	— 8
Insulators	110	— 12
Complete accumulators for motor cars	47	— 16
Parts for accumulators and batteries	736	+ 99
Jars for accumulators	101	— 63
Batteries	82	— 149
Ammeters and voltmeters	36	— 11
Radio-telephone apparatus	123	— 73
Receiving sets	1397	— 326
Amplifiers	101	— 102
Loudspeakers, metal	278	— 29
Radio-telephone parts	1773	+ 176
Telephones	482	+ 59
Telephone material	344	+ 72
Telegraph material	64	+ 27
Cookers, toaster, heaters, etc.	36	— 40
Switches, fuses, etc.	450	— 55
Vacuum cleaners	79	+ 23
Electric bells	65	+ 30
Insulating tape	70	+ 1
Change-over switches	595	+ 155
Telephone switchboards	2	— 11
Electric furnaces	72	+ 44
Incandescent lamps	993	+ 430
House-service meters	1680	+ 1174
Distribution boards	42	— 237
Insulating tubes	14	— 330
Other electric material	1617	— 100
Total	11,750	— 1,091

STOCKS AND SHARES

TUESDAY EVENING.

CONTRARY to what happened in the Stock Exchange markets during the last war, present-day experience points to contraction of public interest in securities as the struggle goes on. From 1915 onwards, the disposition of business in stocks and shares was gradually to increase. There were even a few minor "boomlets." Speculation raised an occasional head: it is not so to-day. In the market for purely gilt-edged issues, a fairly constant demand continues. The front-rank industrials remain in favour. Shares in companies with favourable post-war prospects are attracting attention; in this group there figure the electricity supply and the construction-equipment concerns. It is so generally recognised that the war effort demands all the financial support possible, that capital flows but slowly into other investment channels. Yet share prices keep extremely firm. It may be said that no setback of any consequence has occurred in Stock Exchange markets since they started to rally—as they did very soon—from the slump caused by the defection of France in June last year when War Loan fell to 95¼. Now the price is nine points higher.

The Government and Utilities

The Government has suggested that utility companies should postpone publication of accounts and speeches at meetings until a decision as to what it is advisable to publish, and what to withhold is arrived at. If this request had been made last December, or, better still, twelve months earlier than that, the ordinary man in the street might have considered it a timely suggestion. In view of the fact that many of the companies have already published their accounts, and that some of them have held their meetings, the indecision of the Government is difficult to understand. It will have been noticed that in a number of reports recently published by utility companies, and in advance of the Government's request for restraint in such matters, much of the information usually supplied has been omitted.

Enemy Action

The matter has given rise, however, to criticism on the ground that it can be of very little advantage to the enemy for him to know that, to take one example, a certain area has been bombed, and that a company's power station in that locality suffered damage. The companies have been extremely reticent in giving publicity to information of this kind themselves, but where the happenings occurred many months ago, maybe the enemy knows better than the shareholders do the localities where damage has been inflicted. It may be added that so far as the share market is concerned, no indication has appeared in the list of prices to show whether this company, that, or the other, has been the object of unwelcome attentions from hostile aircraft. The market in electricity supply shares has occasionally gone dull, but at no time was any special share singled out for such marked weakness as would have been the case had a company been badly affected by enemy action.

Transport and Traction

The strength of gilt-edged stocks is reflected in advances amongst London Passenger Transport prior-charge issues. These have gained three points in a week. The junior "C" stock is still dull at 32. London & Home Counties 4½ per cents. are up 1½ to 107; the West Midland 4½ per cent. stock, somewhat similar, but dated for redemption seven years earlier, is left at its previous price of 105½. Southern Railway 5 per cent. preference, a trustee security, has put on 3½ points. At 83¼ the return is 6 per cent. on the money. The speculative 5 per cent. preferred ordinary has risen 2 to 46½. Tilling ordinary shares revolve around 41s. 3d. Tilling and British Automobile ordinary are up $\frac{1}{16}$ at 45s. 9d. B.E.T. deferred is a good market at 800. The preferred is 10 up, at 160. Bristol Trams have risen to 36s. 3d. West Riding at 36s., ex dividend, show a florin gain.

Surprising as it may seem in times like the present, the fact remains that demand for Provincial traction and motor companies is keen. In a list set out by a Stock Exchange firm of dealers, there are eleven different companies in respect of which anything between a thousand and two thousand shares are wanted at, comparatively speaking, high prices. As an instance, for 2,000 Bristol Trams 35s. 6d. is bid. On the 8 per cent., less tax, dividend recently declared, this gives a yield of no more than 4½ per cent., which seems to be a modest return in present circumstances. In a number of these cases, the companies are either controlled by, or their shares are substantially held by, the British Electric Traction, Thomas Tilling, Thomas Tilling and British Automobile, and the Southern Railway. Doubtless the fact that the area of operations of these companies is widely spread, lends attraction to the shares as investments. After the war, the companies, most of which are in a sound financial position, are thought likely to increase their distributions.

Treasury Requisitions

The Treasury have requisitioned from Courtaulds—the well-known artificial silk company—the American Viscose Corporation shares which Courtaulds hold in the United States. The Treasury's action is due, of course, to the need for this country to acquire dollar assets. It has aroused lively interest in various directions, making people ask whether the principle is likely to be applied elsewhere, and leading to a certain amount of activity in the shares of companies that are known to have substantial American holdings. Electrical companies would once have figured largely in this latter class. General Electric shares were held in bulk on the other side of the Atlantic. A block of British Westinghouse shares was for some time in American hands.

The days are long past, however, since the Americans were able to exercise any noteworthy control over British companies. Readers of these paragraphs will perhaps remember the excitement that attended the repatriation of several hundred thousand General Electric ordinary shares from New York to the London market. This was followed by similar action by certain other electrical companies. At the present time, it may be doubted whether, save in very few cases, any British industrial company concerned with the electrical industry, possesses sufficient shares in American concerns to cause the Treasury to cast an envious eye upon holdings that could be realised in America with a view to assisting the exchange position between the two countries.

Price Fluctuations

Whatever disappointment was temporarily caused by the extent of the dividend reductions by the Northmet Power, the County of London and the Metropolitan Electric Supply Companies, its effect was quickly dispelled. Prices are unchanged on the week. British Power & Light ordinary have eased off to 24s. North-Eastern ordinary at 28s. 3d. have recovered the dividend deducted earlier this month, and are up a further 9d. Amongst overseas shares, Victoria Falls have gone back $\frac{1}{16}$ to 73s. 9d. on account of the additional taxes imposed in the new South African Budget. Cable & Wireless 5½ per cent. preference stock has risen to within a point of par, and is 1½ higher on the week: the ordinary keeps steady at 60½. Automatic Telephones show no change at 43s. 9d. upon maintenance of the previously paid dividend of 12½ per cent. for the year. The net profit at £238,000 is £38,000 down.

General Electric ordinary are higher at the round £4. It is already anticipated that the next dividend will again be 20 per cent. A little inquiry for International Combustion shares found them in scanty supply. The price is ¼ up at 92s. 6d. Associated Electrical Industries ordinary are a shade better at 40s., buyers, on the increased profits of £239,400. The company holds all the ordinary shares of British Thomson-Houston, whose profits of £1,357,516 for 1940 are £319,000 higher on the year.

Ericsson Telephones ordinary dividend of 22 per cent., tax free, compares with 25 per cent., tax free, in the previous year. The market was quite satisfied with this, and the price of the shares remains unaltered at 35s.

Laurence, Scott Shares

Laurence, Scott & Electromotors, Ltd., ordinary shares of 5s. each, have recently been showing improvement, and are a firm market at 9s. bid. The company manufactures electrical machinery and motors of every kind, from small to large; its Admiralty orders are substantial. The year ends with December and the accounts usually appear in April. In each of the past three years, the company has paid 15 per cent. dividend on the ordinary shares, and although no increase is expected to be made for the year recently ended, the figures, according to advance anticipation, will be extremely satisfactory. On the basis of a 15 per cent. dividend, the present price gives a return of 8⅓ per cent. on the money.

ELECTRICAL COMPANIES' SHARES

Prices, Dividends and Yields

Company	1940 High-est	1940 Low-est	Dividend Pre-vious	Dividend Last	Middle Price March 24	Rise or Fall	Yield £ s. d.
Home Electricity Companies							
Bournemouth and Poole	63/6	36/6	15	12½	46/3xd.	..	5 8 3
British Power and Light	30/-	20/-	7	6	24/-	−6d.	5 0 0
City of London	28/-	20/-	7½	7	20/-	..	7 0 0
Clyde Valley	33/6	24/-	8	8	35/-	..	4 11 5
County of London	43/3	21/-	10½	8	30/-	..	5 6 8
Edmundson's:							
7% Pref.	32/-	24/3	7	7	28/3	..	4 19 1
Ord.	27/6	18/6	9	6	24/6	..	4 18 0
Elec. Dis. Yorkshire	40/3	32/-	9	9	36/3	..	4 19 4
Elec. Fin. and Securities	42/-	34/6	12½	12½	40/-	..	6 5 0
Elec. Supply Corporation	48/-	39/-	12	11½	37/-	..	6 4 4
Isle of Thanet	16/-	5/6	4	4	7/-	..	—
Lancs Light and Power	33/-	21/6	7½	7½	30/-	..	5 0 0
Llanelly Elec.	21/-	17/-	5½	5½	20/-	..	5 10 0
Lond. Assoc. Electric	21/-	12/6	5½	4½	16/3	..	5 10 0
London Electric	35/-	19/-	7	7	22/6	..	6 4 5
London Power Deb. Red	105½	100	5	5	102½	..	4 17 6
Metropolitan	41/6	22/6	10	8	31/3	..	5 2 3
Midland Counties	39/-	23/3	8	8	34/6	..	4 12 10
Mid. Elec. Power	40/-	29/6	9	9	33/9	..	5 6 8
Newcastle Elec.	29/9	22/6	7	7	25/-	..	5 12 0
North Eastern Elec.:							
Ordinary	31/6	16/6	7	7	28/3xd.	..	4 19 6
7% Pref.	32/6	25/6	7	7	30/-	..	4 13 4
Northampton	44/-	38/-	10	10	40/-	..	5 0 0
Notting Hill 6% Pref. (£10)	10½	9	6	6	8½	..	—
Northmet Power:							
Ordinary	42/3	22/6	10	7	28/9	..	4 17 4
6% Pref.	29/-	23/-	6	6	28/6	..	4 4 3
Richmond Elec.	24/6	18/-	6	6	18/9	..	6 8 0
Scottish Power	38/-	24/-	8	8	3/46xd.	..	4 12 9
Southern Areas	21/3	12/9	5	5	16/3	..	6 3 1
South London	33/3	20/-	7	7	20/-	..	7 0 0
West Devon	20/-	17/6	5	5	20/-	..	5 0 0
West Glos.	22/-	15/-	2½	4½	17/6	+ 1/6	5 2 10
Yorkshire Elec.	40/-	22/6	8	8	36/3	..	4 8 5
Overseas Electricity Companies							
Atlas Elec.	4/-	1/3	Nil	Nil	2/-	..	—
Calcutta Elec.	27/-	22/6	10*	8*	35/6	+6d.	4 10 2
Cawnpore Elec.	30/-	24/-	10	10	27/6	..	7 5 9
East African Power	25/6	19/6	7	7	25/-	..	5 12 0
Jerusalem Elec.	24/-	15/-	7	7	21/3	..	6 11 9
Kalgoorlie (10/-)	12/6	9/6	7½	7½	12/-	..	6 5 0
Madras	26/9	21/6	8*	6*	25/-	..	—
Montreal Power	35½	30	1½	1½	28½	+1	5 5 3
Palestine Elec. "A"	25/-	10/-	5*	Nil	18/9	..	—
Perak Hydro electric	20/3	13/-	2½	6	17/6	..	6 17 2
Shawinigan Power	27½	19	83cts.	90cts.	18	..	—
Tokyo Elec. 6%	69	30	6	6	38½	..	15 11 8
Victoria Falls Power	75/9	56/6	15	15	73/9	− 1/6	4 1 4
Whitehall Investments Pref.	17/9	8/-	7½	7½	12/-	..	12 10 0
Public Boards							
Central Electricity							
1950-70	110½	104	5	5	109	..	4 11 9
1955-75	112½	106	5	5	111	..	4 10 0
1951-73	107½	102	4½	4½	107	..	4 4 0
1963-93	96½	90	3½	3½	98	+1	3 11 5
1974-94	91	79½	3½	3½	90	..	3 12 3
London Elec. Trans. Ltd.	92	87½	2½	2½	93	..	2 15 9
London & Home Counties							
1955-75	113½	105	4½	4½	107	+1½	4 4 0
Lond. Passenger Transport:							
A	116	104	4½	4½	114½	+3	3 18 8
B	116	102½	5	5	109	+3	4 11 9
C	65½	25	1½	3	32	..	9 7 6
West Midland Joint Elec.							
1948-68	106½	103	5	5	105½	..	4 14 9
Telegraph and Telephone							
Anglo-Am. Tel.:							
Pref.	107	85	6	6	100½	..	5 19 3
Def.	23¾	18	1½	1½	23½	..	6 7 8
Anglo-Portuguese	22/6	10/-	8	8	15/-	..	10 13 4
Cable & Wireless:							
5½% Pref.	99¾	66	4½	5½	99	+1½	5 11 1
Ord.	65	27	4	4	60½	..	6 12 3
Canadian Marconi $1	6/-	4/-	Nil	4cts.	5/-	..	6 11 2
Globe Tel. & Tel.:							
Ord.	32/6	21/6	7½*	6*	27/6	..	4 7 3
Pref.	27/9	22/6	6	6	27/6	..	4 7 3
Great Northern Tel. (£10)	20	11	20	20	12½	..	—
Inter. Tel. & Tel.	5½	2½	Nil	Nil	3	..	—
Marconi-Marine	30/-	18/3	10	7½	22/6	..	6 13 3
Oriental Telephone Ord.	2⅞	45/-	12*	11½*	2¾	..	4 3 8
Telephone Props	15/-	11/-	6	6	11/3	..	10 13 4
Telephone Rentals (5/-)	9/6	5/3	10	10	7/3	..	6 18 0

Company	1940 High-est	1940 Low-est	Dividend Pre-vious	Dividend Last	Middle Price March 24	Rise or Fall	Yield £ s. d.
Traction and Transport							
Anglo. Arg. Trans.:							
First Pref. (£5)	4/3	1/-	Nil	Nil	2/-	..	—
4% Inc.	11½	2	Nil	Nil	6½	..	—
British Electric Traction:							
Def. Ord.	830	100	5	45	800	..	5 12 6
Pref. Ord.	169	130	8	8	160	+10	5 0 0
Bristol Trams	48/6	32/6	8*	8	36/3	+ 1/6	4 8 5
Brazil Traction	12½	5½	$1	50c.	7	..	—
Calcutta Trams	24/-	16/3	8	5½	19/-	..	5 15 8
Cape Elec. Trams	18/6	16/-	5	5	17/-	..	5 17 4
Lancs Transport	35/-	27/6	10	10	38/9	+ 3/16	5 3 1
Mexican Light:							
1st Bonds	36	25	5	5	40	..	—
Rio 5% Bonds	95	74	5	5	85	..	5 17 8
Southern Rly.:							
5% Prefd.	79	35	5	5	46½	+2	10 15 0
5% Pref.	104½	59	5	5	85½	+3½	5 19 9
T. Tilling	45/9	29/-	10	10	41/3	..	4 17 0
Tilling & B.A.	47/6	41/9	8*	7*	45/9	+ 1/6	3 1 2
West Riding	35/-	25/-	10	10	36/-xd.	+2/-	5 11 1
Equipment and Manufacturing							
Aron Electricity Ord.	17/6	10/-	15	Nil	18/-	+6d.	—
Assoc. Elec.							
Ord.	43/3	26/6	10	10	40/-	..	5 0 0
Pref.	36/6	32/3	8	8	35/-	..	4 11 5
Automatic Telephone & El.	47/3	32/-	12½	12½	43/9	..	5 14 1
Babcock & Wilcox	50/-	28/6	10	11	40/-	..	5 10 0
British Aluminium Ord.	56/-	29/-	12½	10	39/6	..	5 1 3
British Insulated Ord.	92/6	67/-	20	20	80/-	..	5 0 0
British Thermostat (5/-)	14/9	6/6	18½	18½	11/3	..	8 4 6
British Vacuum Cleaner (5/-)	12/-	4/9	40	12½	6/3	..	10 0 0
Brush Ord.	4/6	1/9	Nil	Nil	4/-	..	—
Callender's	69/-	46/-	15	15	63/9	..	4 13 9
Chloride Elec. Storage	72/6	55/-	15	15	62/6	..	4 16 0
Consolidated Signal	72/6	59/-	17	17	65/-	..	5 4 7
Crabtree (10/-)	24/9	17/6	17½	17½	22/6	..	7 15 7
Crompton Parkinson:							
Ord. (5/-)	20/-	12/-	30	20	18/9	..	5 6 8
E. K. Cole (5/-)	5/-	2/6	10	Nil	4/6	..	—
Elec. & Musical Industries (10/-)	10/3	4/3	5	Nil	7/9	+3d.	—
Electric Construction	36/3	27/6	13½	10	27/6	..	7 5 6
Enfield Cable Ord.	56/-	40/6	16½	12½	50/-	..	5 0 0
Electrical Switchgear (10/-)	22/6	20/-	16	10	20/-	..	5 0 0
English Electric	33/9	16/6	10	10	30/-	..	6 13 4
Ensign Lamps (5/-)	15/3	12/6	25	25	15/-	..	8 6 3
Ericsson Tel. (5/-)	39/3	23/-	25*	22*	35/-	..	3 2 10
Ever Ready (5/-)	28/3	16/6	30	40	25/6	..	7 7 0
Falk Stadelmann	18/3	12/6	6	7	15/9	..	8 17 10
Ferranti Pref.	25/-	22/-	7	7	25/-	..	5 12 0
G.E.C.:							
Pref.	32/6	26/-	6½	6½	32/6	..	4 0 0
Ord.	83/3	53/3	20	20	80/-	+6d.	5 0 0
Greenwood & Batley	25/6	20/-	15	13	20/-	..	13 0 0
Hall Telephone (10/-)	18/6	8/9	15	10	10/-	..	10 0 0
Henley's (5/-)	21/6	12/6	20	20	20/-	..	5 0 0
4½% Pref.	21/2	20/6	4½	4½	21/3	..	4 4 8
Hopkinsons	46/9	32/6	15	15	40/-	+ 1/6	7 10 0
India-Rubber Pref.	21/-	19/6	5½	5½	21/3	..	5 3 6
Intl. Combustion	121/3	70/-	32½	30	92/6	+ 1/6	6 13 4
J. Lucas	60/6	40/-	15	15	56/3	..	5 6 9
Johnson & Phillips	50/9	32/6	12½	15	45/-	..	6 13 4
Lancashire Dynamo	59/9	47/6	25	20	52/6	..	7 12 4
Laurence Scott (5/-)	11/-	6/-	15	15	9/-	..	8 6 8
London Elec. Wire	25/6	20/-	7½	7½	22/-	..	6 13 4
Mather & Platt	46/6	30/-	13½	10	36/3	..	5 11 1
Metropolitan Elec. Cable Pf.	22/-	21/3	5½	5½	21/3	..	5 3 6
Murex	86/9	52/6	20	20	80/-	..	5 0 0
Pye Deferred (5/-)	9/-	6/9	25	25	10/-	..	14 5 8
Revo (10/-)	20/0	11/6	17½	5	20/-	..	2 10 0
Reyrolle	60/6	41/-	12½	12½	50/-	..	5 0 0
Siemens Ord.	23/9	15/6	7½	7½	20/-	..	7 10 0
Strand Elec. (5/-)	2/3	9d.	4	2	1/9	..	5 14 4
S. Smith (1/-)	8/-	3/6	37½	50	6/3	..	8 0 0
Switchgear & Cowans (5/-)	11/9	5/6	20	10	8/9	..	5 14 3
Telegraph Condenser (10/-)	8/9	6,3	5	..	7/6	..	—
Telegraph Construction	42/6	29/-	10	10	36/3	..	5 10 6
Telephone Mfg. (5/-)	9/-	5/-	9	9	7/-	..	6 8 7
Tube Investments	96/9	59/-	23½	22½	90/-	..	5 5 9
Vactric (5/-)	3/6	2/-	4	Nil	2/3	..	—
Vickers (10/-)	22/-	9/6	10	10	15/-	+6d.	6 13 4
Ward & Goldstone (5/-)	19/6	12/6	20	20	16/6	+2/9	5 19 9
Westinghouse Brake	46/-	30/6	17½	10	40/-	..	5 0 0
Walsall Conduits (4/-)	26/6	17/6	55	55	26/3	..	8 7 6
West, Allen (5/-)	7/-	3/-	10½	7½	3/9	..	10 0 0

*Dividends are paid free of Income Tax.

CONTRACT INFORMATION

Tenders Invited and Accepted. Schemes Promising Electrical Work.

Contracts Open

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses. Further details of items marked with an asterisk can be obtained from the Department of Overseas Trade (Inquiry Room), Millbank, Westminster, London, S.W.1.

Dublin.—March 31st. Town Council. Electric time switches and public lighting requirements. Particulars from the city engineer, 28, Castle Street.

Edinburgh.—April 7th. Electricity Department. Coal stocking and re-claiming plant. Specification from Mr. J. Eccles, engineer and manager, Electricity Department, Dewar Place.

Glasgow.—April 23rd. Transport Department. Materials as from June 1st. Forms from the general manager, 46, Bath Street.

North Riding.—April 4th. County Council. Twelve months' supply of electric lamps to the Poor Law Institution. Particulars from Mr. H. G. Thornley, clerk to the County Council, Northallerton.

Omagh.—March 31st. Institution Joint Committee of Management. Electrical requisites, etc., for six months. Forms of tender from Mr. O. L. Walsh, clerk, Mental Hospital.

Portsmouth.—March 31st. City Council. Three 200 kVA and three 300 kVA transformers. Forms of tender from the Contracts Section, City Treasurer's Department, Northern Secondary School.

Salford.—March 31st. Town Council. Traction lamps and tram accessories for twelve months. Forms of tender from the general manager, Transport Office, Frederick Road.

South Africa.—PRETORIA.—April 2nd. City Council. Pipework equipment for the power station. (February 21st.)

April 10th. Union Tender and Supplies Board. Electric cooking apparatus, refrigerator, etc., for the Police Station, Springs. (T.15949/41.)*

April 30th. City Council. Circulating water pumps and pump house equipment. (See this issue.)

CAPE TOWN.—March 31st. Electricity Department. 2,000 fuses. (T.15821/41.)* Ironclad service cut-outs. (T.15820/41.)*

April 15th. 100 AC electricity meters. (T.15985/41.)*

JOHANNESBURG.—April 7th. City Electricity Department. Automatic fire-fighting equipment for switchgear and transformers. (T.15847/41.)*

April 15th. Railways and Harbours Administration. Automobile batteries. (T.15961/41.)*

Thurles.—April 17th. U.D.C. Four electrically driven centrifugal pumps for sewage scheme. Particulars from Mr. N. O'Dwyer, consulting engineer, 6, Burlington Road, Dublin.

Tipperary.—April 19th. Board of Health and Public Assistance. X-ray equipment for county hospital at Cashel. Mr. E. Beary, secretary, District Hospital, Clonmel.

Orders Placed

Bedford.—Highways Committee. Recommended. Electric paper baler (£175).—Camco (Machinery).

Bootle.—Watch Committee. Accepted. Four mobile wireless sets and receiver (£425).—G.E.C.

Glasgow.—Transport Committee. Accepted. Rectifying equipment in connection with the scheme for alternative power supply for transport services. Four sets (£32,788).—G.E.C.; three sets (£25,332).—English Electric Co.; three sets (£26,250).—Bruce Peebles and Co.

The prices quoted will be subject to certain deductions in view of changes necessitated in the scheme since the tenders were invited.

Transport Committee. Accepted. Flexible cable.—B.I. Cables.

Islington.—Electricity Committee. Recommended for 12 months. Paper insulated cables.—B. I. Cables; G.E.C.; Edison Swan Cables; Telegraph Construction & Maintenance Co.; Aberdare Cables; Hackbridge Cable Co.; Britannic Electric Cable Co. E.h.v. and h.v. rubber insulated cables.—B.I. Cables. Transformers.—British Electric Transformer Co.; Lindley Thompson Transformer & Service Co.; Hackbridge Electric Construction Co. Cable, terminal, service, network, fuse boxes, etc.—Callender's; B.I. Cables; W. Lucy & Co.; Aero Engines; Siemens Bros. & Co.; Henley's; A. C. Woodrow & Co.; Clay Cross Co.; Dussek Bitumen & Taroleum Co.; L. Andrew & Co. Electric lamps.—B.T.H. Co.; G.E.C.; Philips Lamps; Crompton Parkinson; Ensign Lamps. Electrical wires and sundries.—Lighting, Heating & Traction Supplies Co.; Dacier. Electricity meters.—Sangamo Weston; Metropolitan-Vickers; Aron Electricity Meter.

Morley.—Electricity Committee. Accepted. Transformers.—C. A. Parsons & Co.

Rotherham.—Electricity Committee. Accepted. Mercury arc rectifier equipment (£597).—G.E.C.

Contracts in Prospect

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Basford.—Additions to nurses' home and new store at Institution, for Notts. C.C.; county architect, Shire Hall, Nottingham.

Belfast.—Alterations to Police Courts, for T.C.; city surveyor, City Hall, Donegall Square.

Berkhamsted. — Nursery school, for U.D.C.; Surveyor's Office, Northchurch, Berkhamsted.

Blackley. — Rebuilding the Alliance Inn, Rochdale Road and Kay Street; Boddington's Brewery Co., Ltd., Strangeways Brewery, Bridge Street, Manchester.

Boston.—St. Aidan's Church, Fenside Road, for Trustees; Rev. A. M. Cook, The Vicarage, Boston.

Caernarvon.—Additions, blocks and huts ments to hospital, for the Caernarvonshire Health Committee; W. Ll. Jones, county architect, County Offices, Shirehall Street.

Clitheroe.—Extensions and alterations, school kitchen, for E.C.; borough engineer, Church Street.

Coleshill.—New Stonebridge Hotel, Bacon's End; Ansells Brewery, Ltd., Aston Brewery, Birmingham.

Cork.—Houses (100), between St. Mary's Hall and Cathedral School; C. Harrington, town clerk, City Hall.

Coventry.—Extension, City School of Art, for E.C.; D. E. E. Gibson, M.A., city architect, 1a, Warwick Row.

Cradley Heath.—Licensed premises, Surfeit Hill, Codsall Estate (£7,000), to replace Anchor Inn, Cradley Road.

Derby. — Completion of ground floor, technical college, engineering block (£16,175), for E.C.; city engineer, Corporation Offices.

Ellesmere Port.—Rebuilding 218-224, Princes Road, for U.D.C.; P. J. Hodges, clerk, Council Offices.

Gateshead.—Substation and additions to motor garage, St. James' Road, for Clarke, Chapman & Co., Ltd.; own architect.

Hebburn-on-Tyne.—Offices, etc., for A. Reyrolle & Co., Ltd.; Cackett, Burns Dick & McKellar, Ellison Place, Newcastle-on-Tyne.

Holland (Lincs.).—Maternity unit (100 beds), for C.C.; W. M. Smith, county architect, County Hall, Boston.

Huntingdon.—Houses, Alconbury, Weston, and Abbots Ripton; R.D.C. surveyor.

Kelso.—Reconstruction of hospital wing; J. P. Alison & Hobkirk, architect, 8, Orchard Terrace, Hawick.

Leitrim.—Houses (14), Manorhamilton, for Board of Health and P.A.; McDonnell & Dixon, architects, 20, Ely Place, Dublin.

Littleborough. — Alterations, Queen's Hotel, for Bury Brewery, Ltd., Bury; A. Pursglove, architect, 16, Oxford Street, Manchester.

Ludlow.—Houses (24), Cleobury Mortimer, for R.D.C.; surveyor, Rural Council Offices.

Moreton-in-Marsh. — Houses (39), for agriculturists, for North Cotswold R.D.C.; J. E. Busfield, surveyor, Moreton-in-Marsh, Glos.

Newcastle-on-Tyne. — Conversion of orphan house, Northumberland Street, to Y.M.C.A. hostel; J. Walton Taylor, Union Buildings, St. John Street.

Old Trafford.—Offices, Elsinore Road; E. Boydell & Co., Ltd., engineers, Manchester.

Poole.—Alterations and equipment, Kemp Welch Senior School, for feeding centre (£1,875), for T.C.; J. R. Barron, borough engineer, Municipal Buildings, Parkgates East.

Rishton.—Completion of new senior school, for Lancs. E. C.; T. Croft & Sons, Ltd., building contractors, Blackpool Road, Preston.

Rotherham. — Adaptation of Fairfield, Moorgate, for police offices.

Sheffield.—Reconstruction of sales showrooms, Carver Street; Willson's (L. & P.), Ltd., The Moor.

Somerford.—Hotel (£7,000); Strong & Co. of Romsey, Ltd., Dolphin Brewery, Poole.

Stirlingshire.—Communal feeding scheme (£22,026), for C.C.; J. Coutts Morrison, director of education.

Trafford Park.—Bank premises, Third Avenue, for Williams Deacon's Bank, Ltd., 38, Mosley Street, Manchester.

Uttoxeter.—Booster plant for improving water supply, Bramshall; C. E. Ingham, R.D.C. surveyor, Market Place.

Wexford.—Bungalows (34), Green Street, for T.C.; J. J. Byrne, town clerk, Town Hall.

Wigton. — Water scheme (£15,860), for R.D.C.; Taylor & Wallin, engineers, Newcastle-on-Tyne.